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Health
Building Note 40
Volume 1

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Volume 1: Public areas

Common activity spaces

NHS Estates
An Executive Agency of the Department of Health

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Volume 1 : Public areas

Common activity spaces

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About this publication

The Health Building Note (HBN) series is intended to give advice on the briefing and design implications of Departmental policy.

These Notes are prepared in consultation with representatives of the National Health Service and appropriate professional bodies.

Health Building Notes are aimed at multidisciplinary teams engaged in:

- designing new buildings;
- adapting or extending existing buildings.

Throughout the series, particular attention is paid to the relationship between the design of a given department and its subsequent management. Since this equation will have important implications for capital and running costs, alternative solutions are sometimes proposed. The intention is to give the reader informed guidance on which to base design decisions.

The four volumes of HBN 40 identified by the general title 'Common activity spaces' bring together guidance on spaces that frequently occur in common form in health buildings. Other Health Building Notes, dealing with specific departments, refer to HBN 40 for guidance on these commonly occurring spaces.

Acknowledgments

The Royal National Institute for the Blind.

Access Committee for England (extract from HBN 40, Volume 4, 1988/9)

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1.0 Scope of Health Building Note 40, Volume 1

Introduction

1.1 This document is the first volume of Health Building Note 40, 'Common activity spaces', which provides guidance on activity spaces frequently occurring in common form in health buildings. The previous issues of HBN 40 were Volumes 1 and 2 in February 1985, and Volumes 3 and 4 in 1988. All four volumes of HBN 40 have now been restructured and updated to reflect the latest thinking on common activity spaces in health buildings and to provide guidance on access provisions for disabled people to these buildings.

1.2 This volume – Volume 1 (Public areas) – provides detailed ergonomic data on a variety of public spaces, and is related to information in Activity Data Sheets specifically prepared to complement this volume. It aims to provide the essential information with which the designer may produce the most effective and efficient solution for a particular project.

1.3 Volume 2 (Treatment areas) provides detailed ergonomic data on a variety of clinical and sanitary spaces and associated components, and is related to information in Activity Data Sheets specifically prepared to complement that volume.

1.4 Volume 3 (Staff areas) provides detailed ergonomic data on a variety of administrative and support spaces and associated components, and is related to information in Activity Data Sheets specifically prepared to complement that volume.

1.5 Volume 4 (Circulation areas) deals with internal horizontal and vertical hospital circulation and communication spaces (that is, corridors, lifts and stairs). It provides guidance on the planning and design of traffic routes both within and between hospital departments. Particular emphasis is given to the space requirements for the movement of people, goods and equipment.

1.6 This guidance relates space provision to the functions of an activity space, having regard at all times to the need for economy. Where design teams use this information to determine space layouts and sizes, the need for economy should always be a prime consideration so that maximum advantage can be obtained from the departmental cost allowance. Activities should be carefully considered so that space can be shared for similar activities or for activities which take place at different times.

1.7 Where a common activity space occurs in the building note for a department, there will be no detailed description of that space, but instead there will be a cross-reference to that building note. Where there are special departmental requirements which warrant a variation from the common form of the activity space, appropriate information is provided in the relevant building note.

1.8 In the text of this volume, documents are mainly referred to by their title only. Full details of these documents are included in the 'References', which constitute Appendix 2 of this volume.

1.9 Details of other relevant publications, research and associated material which may be of interest for further reading are contained in Appendix 3 of this volume.

Capital Investment Manual

1.10 The Capital Investment Manual (England and Wales; in Scotland see 'Health Building Procurement in Scotland') contains the NHS Executive's procedural framework governing the inception, planning, processing and control of individual health building schemes. Although there are various mandatory requirements within the overall process, the individual NHS trusts are, in the main, granted a certain degree of flexibility in the manner in which these tasks are to be carried out; however, approval from the NHS Executive for business cases will depend on how the trusts intend to carry out the mandatory tasks. The Manual gives guidance on the technical considerations of the full capital appraisal process, while also providing a framework for establishing management arrangements to ensure that the benefits of every investment are identified, realised and evaluated. It emphasises three key points:

- each individual scheme must be supported by a sound business case. A business case must convincingly demonstrate (by means of an option appraisal) that the investment is economically sound and financially viable (that is, affordable to the trust and its purchasers);
- an exploration of private finance alternatives should be viewed as a standard option whenever a capital investment scheme is being considered. Once the Outline Business Case has been approved, the preferred option should be compared to potential private finance alternatives. Approval to the Full Business Case will not be given unless there is a clear demonstration that private finance alternatives have been adequately explored;

- the delivery of a major capital project is a difficult and complex task. Nevertheless, any failure to deliver on time and to cost will divert resources from direct patient care. The establishment of an appropriate project control/monitoring system and organisation is essential, in order to ensure that projects are delivered within the agreed budgets and timescales.

Cost allowances

1.11 The DCAGs (Departmental Cost Allowance Guides) associated with Volumes 1 to 3 of this Health Building Note are promulgated in *Quarterly Briefing* (issued separately under cover of an Estate Policy Letter) on behalf of the NHS Executive.

Equipment

1.12 The equipment used in the areas covered by this volume (that is, the public areas of a health building) can be categorised into four groups, as follows:

Group 1: items (including engineering terminal outlets) which are supplied and fixed within the terms of the building contract;

Group 2: items which have specific requirements with regard to space and/or building construction and/or engineering services and are fixed within the terms of the building contract but supplied under arrangements separate from the building contract;

Group 3: as Group 2, but supplied and fixed (or placed in position) under arrangements separate from the building contract;

Group 4: items which are supplied under arrangements separate from the building contract, possibly with storage implications but otherwise having no effect on the requirements for space or engineering services.

Works Guidance Index

1.13 The guidance contained in this volume is current at the time of publication. (Specific issues, such as arrangements for dealing with fire, security, energy conservation, etc., are covered by other published documents, which must also be taken into account.) Some aspects of this guidance may from time to time be amended or qualified. Project teams should check the current edition of the Works Guidance Index. Because the Index is published annually, project teams should ensure that they are using the current edition, and should contact NHS Estates Library should the need arise to check any items.

2.0 Design and functional considerations

Introduction

2.1 The guidance in this document is intended to enable health buildings to be designed which are accessible, safe and usable by all potential categories of user; these will include children, an increasing number of elderly people, also patients and visitors who have mobility, sensory and dexterity impairments, and staff. (It must be stressed that healthcare buildings are places of work for people with disabilities.) These physical limitations impose special demands on the internal and external design of health buildings. Specific considerations include the following.

Disabled people

2.2 Identifying and understanding the conditions which constitute barriers to those with a disability (this category includes, besides the wheelchair-bound, those who for any reason have difficulty in walking, also those with a sensory – that is, visual or hearing – impairment) is a fundamental requirement for the effective provision of accommodation and facilities to be used by disabled people. It is advisable to consult with all groups of potential users of the building (including people with disabilities and staff from all departments) at the early planning stage.

2.3 If the needs of people who have temporary or permanent disabilities are taken into consideration, the resulting design can make the building easier and safer to use for those with children, those using wheeled equipment and those carrying other items. The principle of applying critical criteria should be used – for example, where space is a consideration, wheelchairs or other larger wheeled items need to be considered; for vertical fixtures or fittings the shorter person and wheelchair user must be considered; and for wayfinding those with visual and hearing impairments must be considered. The resulting design will help not only people who are ill or disabled but also those who are suffering from shock or stress, as many users of health buildings are. Building design which gives consideration to all users will also be easier and safer to use during an emergency evacuation.

2.4 The best design philosophy is to consider the journey through the health building from start to finish, analysing all the related components of the task (negotiating entrances, corridors, lifts, reception areas, toilets, etc) to ensure that the features, equipment and fittings encountered in completing the journey are suitably designed so that the overall task can be completed easily and conveniently, bearing in mind the different requirements of staff, patients and visitors with varying degrees of functional mobility. In this way, building users will be more independent (less reliant upon staff) and consequently less stressed, anxious and frustrated.

2.5 People with disabilities can be defined as those who, as a consequence of an impairment, may be restricted or inconvenienced in their access to, and use of, buildings because of the physical barriers, such as doors which are too narrow, or flights of steps, or unsuitable facilities (such as inadequate lighting, or lack of handrails on staircases or grabrails in toilets). Some people will be temporarily disabled as a result of their need for hospital treatment.

2.6 The following categories of building user are generally recognised:

a. **fully-ambulant:** persons who are fully physically capable of carrying out all activities necessary to their role or function;

b. **semi-ambulant:** persons who walk with difficulty or are otherwise insecure, as a result of a temporary or permanent impairment of the lower limbs. They may walk with or without a walking aid (sticks, crutches, walking-frames, etc) and/or require the assistance of another ambulant person. Some people in this category will, in addition, have reduced strength and dexterity in the upper body and/or a sensory impairment. Semi-ambulant people find it difficult to cover long distances (even 50 m may be too far). Specific design requirements include: short distances; provision of handrails and suitable places for taking a rest; also even and non-slippery surfaces without any major changes in level;

c. **non-ambulant:** persons who temporarily or permanently require to use a wheelchair for mobility. They may propel themselves, or be pushed and manoeuvred by an assistant who may or may not be needed to assist with other tasks. Some people will be using a wheelchair for the first time due to being in hospital and will be unfamiliar with manoeuvring it. Some people who use wheelchairs will, in addition, have reduced strength and dexterity in the upper body and/or may also have a sensory impairment. Some will be able to stand on their feet whilst transferring to and from a wheelchair or to and from other facilities (such as a toilet, chair or bed); others will require assistance to do so (in some cases the use of a hoist). Specific design requirements include the provision of sufficient space for passing and turning; even surfaces without changes in level; and ensuring that any counters, signs, handles, etc are within the user's range of vision and grasp;

d. **manually-impaired:** persons who have a temporary or permanent lack of strength and/or dexterity in the shoulders, arms and/or hands. They may also be semi-ambulant and/or have a sensory impairment. Specific design requirements include doors which are not too heavy; suitably-designed handrails and controls, etc;

e. **visually-impaired:** persons who are totally blind or partially-sighted. Blind people find their way by noticing changes in the textures of floor and wall surfaces and ambient sounds and smells; some also need the help of a cane for orientation and for detecting obstacles. Partially-sighted people need plenty of light, and the colours of any fixtures and fittings they are trying to locate (or are on their guard against) must stand out plainly in contrast with the background. It must be remembered that vision deteriorates considerably with age; 40-year-olds need twice as much light and 60-year-olds three times as much light to see the same object as clearly as a 20-year-old. The more strongly an object contrasts with its surroundings, the easier it is to see. However, colours do not have to be garish; subtle changes in colour can be aesthetically pleasing, and can fit in with the general decor as well as providing contrast. Different colours in the same tone can appear very similar to people who are colour-blind – for example, a strong red and green together can look much the same – and so contrasting tones, or a combination of tone and colour, are very helpful for people with poor sight. Any type of cluttered design should be avoided, since this makes it more difficult for a visually-impaired person to "read" the shape of a space, and consequently impedes their ability to navigate. Good design therefore should not only contribute towards the "legibility" of a building, but also facilitate easy navigation through it. Specific design requirements include: a simple, well-planned layout; even surfaces with tactile indications or direction; no obstructions in walking areas; well-lit areas; signs placed at a convenient height, with space to stand in front to read them;

f. **hearing-impaired:** persons who are deaf and hard-of-hearing have the additional problem that their disability cannot be seen and is therefore not noticed by other people. For effective lip-reading, building areas must be well lit in order that the face of the person speaking is illuminated. Specific design requirements include: a simple, well-planned layout, with well-lit areas; surfaces which dampen ambient noise; signs placed at a convenient height, with space to stand in front; provision of induction loops at reception areas and in auditoria.

2.7 A checklist giving a suggested sequence of activities to be followed in the planning and design of access and facilities for disabled people, was prepared by the Access Committee for England for the 1988/89 edition of HBN 40, Volume 4; this is reprinted as Appendix 1 to this volume of the current edition (as well as volumes 2, 3 and 4), and is commended to health authorities.

Statutory and other requirements

2.8 The guidance contained in this volume takes account, as far as possible, of all statutory and other requirements in force at the time of publication, but health authorities and trusts are reminded of their responsibility for ensuring compliance with all relevant statutes and regulations: such as the provisions of the Chronically Sick and Disabled Persons Act 1970 (as amended by the Chronically Sick and Disabled Persons (Amendment) Act 1976), the Disabled Persons Act 1981, the Disabled Persons (Services, Consultation and Representation) Act 1986, and, in England and Wales, the Building Regulations 1991 together with the associated practical guidance in Approved Document M (in Scotland, the Building Standards (Scotland) Regulations 1990 together with Part T of the Technical Standards (Scotland)). Attention is also drawn to BS5810, Access for the Disabled to Buildings 1979 (currently under review). One of the effects of the 1981 Disabled Persons Act is to apply this British Standard to premises covered by the 1970 Act, which includes those open to the public. Practical guidance for complying with the Building (Disabled People) Regulations is issued by the Department of the Environment under Approved Document M: Access and Facilities for Disabled People, 1992.

2.9 Chapter 6 of this volume contains data relating to the ergonomic requirements for the movement of hospital patients and equipment. These ergonomic data sheets are principally concerned with the amount of "space" needed by disabled people when using health buildings or receiving treatment. They cover access to and egress from (and also movement within) hospital buildings. However, where the Statutes, Approved Documents, British Standards, HTMs, etc stipulate additional requirements – such as larger dimensions – then these should be complied with.

Privacy

2.10 The design of the accommodation must preserve the dignity and privacy of patients, particularly where men and women are treated in adjacent areas and share certain accommodation and circulation spaces. These must be reconciled with the need for unobtrusive clinical observation, which is vital for the care of the patient.

Fire precautions

2.11 The principles of fire safety, and the need for fire precautions, apply equally to new buildings and to any upgrading of, or alterations to, existing buildings.

2.12 The project team should refer to Firecode (England and Wales), or Firecode in Scotland (Scotland) which contains the Department's policy and technical guidance on fire safety in hospitals and other NHS premises. A full list of Firecode documents is provided in Appendix 2. For buildings where the means of escape guidance in Firecode is not applicable, additional guidance is provided by BS5588: Part 8 'Code of Practice for means of escape for disabled people'.

Upgrading, extending or adapting existing buildings

2.13 The standards set out in this HBN essentially apply to the provision of accommodation in a new building. However, the basic principles are equally valid – and should be applied, so far as is reasonably practicable – when existing accommodation is being upgraded, or when new accommodation is being constructed within an existing building which may have previously been used for other purposes. In some instances, compromises may have to be made between Health Building Note (HBN) standards and what is physically achievable.

2.14 Before any decision is made to carry out an upgrading project, consideration must be given to the long-term strategy for the service, the space required for the new service, and the size of the existing building. Regard must also be paid to the orientation and aspect of the building, whether or not the key HBN requirements can be met – for example, the need for accommodation with ground-level access and the adequacy and location of all necessary support services.

2.15 If a prima facie case for upgrading emerges, the functional and physical conditions of the existing building should be thoroughly examined, including:

- the availability of space for alterations and additions;
- the type of construction;
- any insulation provided;
- the age and condition of the building fabric – for example, external and internal walls, floors, roofs, doors and windows – which may be determined by a condition survey;
- the life expectancy and future adequacy of engineering services, including consideration of ease of access and facility for installing new wiring and/or pipework;
- the height of ceilings (existing high ceilings do not necessarily call for the installation of false ceilings, which are costly and often impair natural ventilation);
- any changes of floor levels, in order to eliminate or minimise any potential hazards for disabled people;
- any physical constraints to the proposed adaptation, such as load-bearing walls and columns.

2.16 When comparing the cost of upgrading or adapting an existing building to that of a new construction, due allowance (in addition to the building costs) must be made for such factors as the cost of demolition and salvage, the cost of relocating people, any costs incurred due to the disruption of services during the phased life of the project, and the temporary additional running costs due to any impaired functioning of areas affected by the upgrading work.

2.17 The cost of any proposed upgrading works should conform to the guidelines indicated in the Department's WKO letter (81)4 (AWO (81)8 in Wales). These guidelines take into consideration the estimated life of the existing building and the difference in cost between upgrading the existing building and constructing a new building.

Building components

2.18 The Building Components Database consists of a series of Health Technical Memoranda (HTMs) which provide specific design guidance on building components for health buildings which are not adequately covered by British Standards. No firms or products are listed. The numbers and titles of the relevant HTMs are listed in Appendix 2 of this volume.

Maintenance and cleaning

2.19 Materials and finishes should be selected to minimise maintenance and be compatible with their intended function. Any finishes that require frequent redecoration, or are difficult to service or clean, should be avoided. At the design stage, special consideration should be given to areas such as entrances, corners, partitions, counters, and any others which may be subjected to heavy use. Floor finishes should be restricted in variety, and, in cases where soft floor coverings are specified and spillage is anticipated, these finishes should have a non-absorbent pile and a backing which is impervious to fluids. Wall coverings should also be robust, and chosen with easy cleaning in mind. (Health Technical Memoranda 56, 58 and 61 provide guidance on these aspects with regard to partitions, internal doorsets and flooring respectively.)

Damage in health buildings

2.20 When designing and equipping health buildings, the likely occurrence and effects of accidental damage should be considered. Damage in health buildings has increased over the years due to the use of heavier mechanical equipment for the movement of patients and supplies and,

to some extent, as a result of lightweight, often less robust, building materials. Most damage to doors, and to floor and wall surfaces, is caused by wheeled traffic. Measures to minimise damage should be taken in the form of protective corners, buffers and plates, and to proper continuation of floor surfacing – that is, strong screeds and fully bonded floor coverings. Protective devices should be capable of being renewed as the need arises. Reference should be made to the relevant British Standards, to the advice in the Department of Health's DS (Supply) letter 42/75 (dated 5 August 1985) regarding the buffering of movable equipment, and to the guidance in HBN 40, Volume 4 ('Circulation areas'). Further information is provided in HTMs 56, 58 and 61.

Signposting

2.21 Whilst the ergonomic data sheets in section 6 of this volume provide general locational recommendations, the notes to these data sheets (and to those in Volume 4 of HBN 40), and also HTM 65, 'Health signs', should be consulted for further specific guidance on signage design and practicality considerations.

External environment

Parking areas

2.22 Special parking spaces are required for cars and ambulances. Such spaces should be of sufficient size, both in width and length, to allow unobstructed access, and also for vehicles used by disabled people (whether ambulant, in wheelchairs, alone or assisted). In particular, this will necessitate the allocation of considerably more space alongside each parking space, in order to permit the manoeuvring of wheelchairs and the transfer of disabled persons to and from cars. (Some cars are specially adapted with electro-mechanical transfer equipment which is installed in place of some of the car's normal seating arrangements.) The parking and setting-down areas should be level, near the building's entrances, and located to allow the users to reach the entrances without obstruction. The setting-down area for ambulances should be under cover.

2.23 Well-drained, slip-resistant surfaces are required. Any crossovers should be ramped. External doorways should either be free from thresholds and steps, or, if any change in level is necessary, a suitable ramp will be required. The doorway should be wide enough to allow the unobstructed passage of patients in wheelchairs.

2.24 Further guidance regarding the design of car parking areas and associated facilities can be found in the notes to the relevant ergonomic data sheets in Chapter 6 of this volume.

Courtyards

2.25 Courtyards enable more rooms to receive natural daylight and ventilation, and provide an outlook which can compensate for the lack of a more extensive view. Suitable layout and planting can help to preserve privacy in surrounding rooms. Ground-cover planting is preferred to grass, as it is often more successful and is generally easier to maintain. Access for maintenance purposes should be from a corridor, so that patients and staff are not disturbed. (Reference should be made to HBN 45, 'External works for health buildings' (1992), for more detailed guidance on the subject.)

Circulation spaces

2.26 Sufficient space should be provided for the movement of wheelchair users – that is, passage through doors and along corridors, also turning and manoeuvring in lobbies, toilets, changing areas and lifts. Changes in level should be avoided, or else ramps should be provided if this is unavoidable; the space where any such change in level occurs should be particularly well-lit.

2.27 In order to help the ambulant disabled person, an easy-grip tubular handrail (with a diameter of between 45 mm and 50 mm) should be provided along both sides of a corridor. All doors should be fitted with door closers and rising-butt hinges. Any self-closing doors should be easy to open and capable of being temporarily restrained while the disabled user is passing through. Avoidance of projections and obstructions is particularly important for blind and partially-sighted patients. Items of essential equipment such as fire extinguishers, hose reels and other appliances should either be recessed into the wall or boxed in. Large areas of glass should be clearly marked, at eye level, with a coloured label or contrasted logo at least 150 mm by 150 mm in size. Careful consideration should be given to such matters as the direction of door swings and the siting of radiators, call points and notice boards; these should, while remaining accessible, create minimal (if any) obstruction.

Doors

2.28 Doors and frames are particularly vulnerable to damage from mobile equipment, and materials capable of withstanding such damage should be used. All double swing-doors should incorporate clear glass vision panels, but specific considerations of clinical privacy or safety may require that the panels should be capable of being obscured. Where necessary, doors should be capable of being fastened in the open position. Magnetic door-retainers, where fitted, should not restrict the movement of traffic.

Windows

2.29 In addition to the various statutory requirements, the following aspects require special consideration when designing a health building: illumination; ventilation; insulation against noise; user comfort (including the prevention of glare); energy conservation. Windows have an important function in health buildings, in providing a reassuring visual link with the outside world. The building design should ensure that it is possible for cleaners to have easy access to the inside and outside of windows. Specific guidance on types of windows to be used and in particular their safety aspects, is available in HTM 55, 'Windows'.

Natural and artificial lighting

2.30 A light and pleasant interior is required in a health building, with an adequate level of illumination that can be varied to suit functional activities. Because natural lighting is so variable in quality and quantity, the provision of a comprehensive artificial lighting installation is essential. Sunlight enhances colour and shape, and helps to make a room bright and cheerful. The harmful effects of solar glare can be dealt with by architectural detailing of window shapes and depth of reveals, as well as by installing external and/or internal blinds and curtains. Wherever possible, spaces which are to be occupied by patients, their escorts or staff should have natural daylight, with an outside view. Artificial lighting, as well as providing levels of illumination to suit particular activities, can make an important contribution to interior design in health buildings. Further guidance regarding the provision of lighting is given in Chapter 4 of this volume ('Engineering services').

Internal spaces

2.31 Internal spaces may contribute to economy in planning; if, however, additional artificial lighting and ventilation are then required, both capital and running costs are likely to be increased. Such rooms do not provide good working conditions, and staff may in consequence be difficult to retain. Internal spaces should therefore be used only for activities of infrequent or intermittent occurrence or which demand a controlled environment. Rooms that are likely to be occupied for any length of time by staff or patients should have windows.

Ventilation

2.32 Natural ventilation is preferred unless there are internal spaces or clinical reasons which call for the installation of mechanical ventilation or air-conditioning systems, both of which are expensive in terms of capital and running costs: planning solutions should be sought which take maximum advantage of natural ventilation. The costs of providing mechanical ventilation and air conditioning can be minimised by ensuring that wherever practicable, core areas are reserved for rooms whose function specifically requires mechanical ventilation or air-conditioning, irrespective of whether their actual location is internal or peripheral. Further guidance regarding ventilation systems can be found in Chapter 4 of this volume ('Engineering services').

Flooring

2.33 Floor coverings and skirtings should contribute to the provision of a non-clinical environment, yet at the same time be hardwearing. They must not present a hazard to disabled people, nor restrict the movement of wheeled equipment. Floors should neither be, nor appear to be, slippery, and their patterning should not induce disorientation. The material used for flooring should be non-reflective. Changes in floor level should be avoided wherever possible. Such factors as surface drag, static electricity, flammability, infection hazards and impermeability to fluids have also to be considered when choosing flooring. (HTM 61, 'Flooring', should be consulted for advice on user requirements and performance selection.) Finishes should be appropriate for the activities to be carried out, and also restricted in variety for ease of cleaning and compatible with agreed cleaning routines.

Fittings

2.34 Vertical space considerations will include the positioning of any fitting or equipment likely to be used by a disabled person. This will include door handles, telephones, switches, shelving, handrails, grabrails, wash-basins, soap dispensers, mirrors, coat-hooks and paper-towel dispensers. Reception desks should always be designed so that they are unobstructed for, and accessible to, persons in wheelchairs. Both horizontal and vertical space considerations are detailed in the ergonomic data sheets included in Chapter 6 of this volume.

Information technology

2.35 Information technology (IT) has a central role in health management. The use of computers and telecommunications (computer screens, input devices, printers, fax machines, modems, etc) – and indeed the rate of technological innovation – continues to increase. Computer workstations must comply with the Health and Safety Executive's Display Screen Equipment Regulations (L26, 1992). Computing expertise is now widely available in the NHS, and project teams should ensure, at an early stage, that they keep themselves well informed concerning current and projected local computing policies, and that their own proposals conform with such policies.

2.36 There are three principal factors which must be considered when providing IT equipment:

- space; computer workstations must be designed to the dimensions which will provide sufficient space for the computer, its peripherals and its operator;
- visibility; computer workstations should be designed and sited so that the room lighting provides satisfactory lighting conditions, giving sufficient and appropriate contrast between the screen and the background environment so that the content of the screen is clearly legible; the ambient lighting, and other sources of light – such as windows and brightly coloured fixtures or walls – should not cause reflections or glare on the screen;
- noise; most modern printers (for example laser and inkjet printers) have acceptable noise levels; if a printer is noisy, a printer hood could be fitted, or alternatively the printer could be located in an easily accessible but separate area.

Security

2.37 Assaults on hospital staff and theft of NHS property should be addressed. The project team should discuss security with the local police Crime Prevention Officer and the hospital or district's security officer or adviser at an early stage in the design of the building. Fire and Security Officers should be consulted concurrently, as the demands of security and fire safety may sometimes conflict. The attention of planners is drawn to HSG (92)22 (in Wales WHC (92)46) and the revised NHS Security Manual to which it refers, concerning issues of security.

Portering

2.38 The movement of goods or patients to, from or within the building may be beyond the capacity of its occupants; this situation may generate requirements for portering assistance.

Smoking

2.39 NHSME circular HSG(92)41 dated October 1992, 'Towards smoke-free NHS premises', promulgates Government policy set out in the 'Health of the Nation' white paper; it required NHS authorities and provider units to implement policies so that the NHS became virtually smoke-free by 31 May 1993. The circular advises that a limited number of separate smoking rooms should be provided where necessary, for those staff who cannot give up smoking and for those patients who cannot stop smoking. No specific provision has been made in this Note, therefore, for any staff or patients who wish to smoke.

3.0 Critical dimensions

Introduction

3.1 Critical dimensions are those dimensions which are critical to the efficient functioning of an activity; thus, the size of components, their positioning and the space around them may all be critical to the task being performed. Guidance on these dimensions for a particular activity is provided in the form of component-user data sheets. These illustrate components – that is, equipment, furniture and fittings – and provide ergonomic data on the space required for users to move, operate or otherwise use the component; information about the component – for example fixing heights – and the users – for example reach – is also provided. Component-user data sheets thus complement the information given on Ergonomic Data Sheets.

Component dimensions

3.2 These relate to the size and position of components, as follows:

a. sizes of components are shown thus:

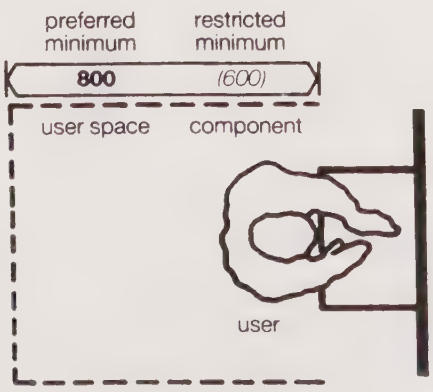
b. preferred component fixing heights are shown as heights above floor level, thus:

1000
1000-1300

(In some cases an acceptable range of fixing heights is also given in italics.)

Activity dimensions

3.3 Activity dimensions define the user space, which is the minimum space required to perform an activity. Two types of activity dimension are given:

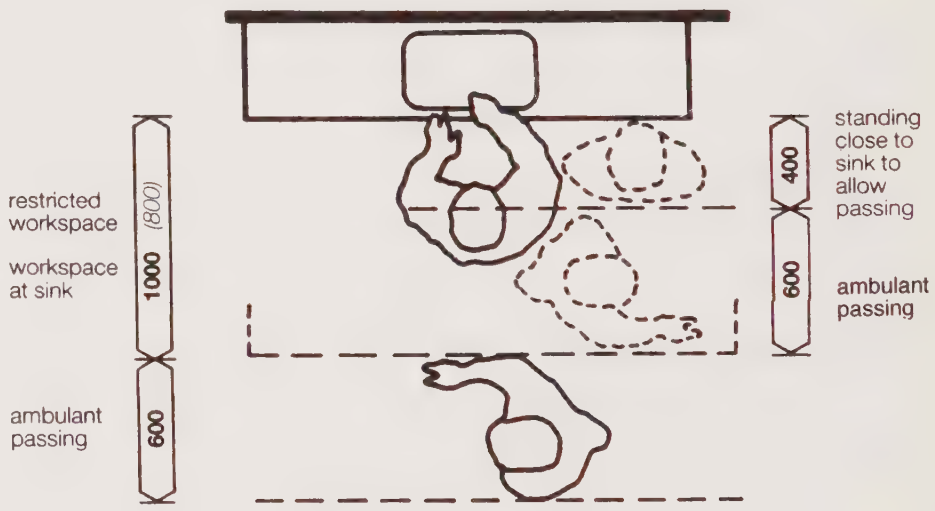


a. preferred minimum – this defines the minimum space required to carry out an activity efficiently, and is shown in bold type;

b. restricted minimum – this will only allow the activity to be performed at the expense of the user experiencing some difficulty. It is not recommended for general application but may be appropriate when considering the overlapping that can be allowed when two user spaces are adjoining.

Selection of activity dimensions

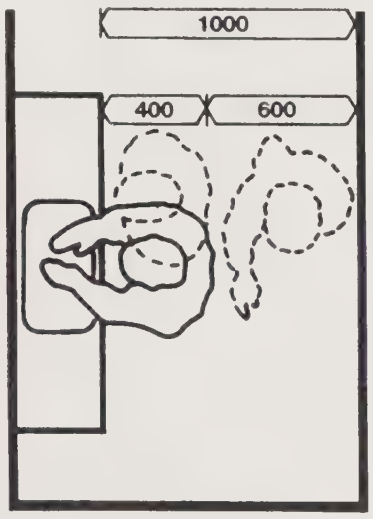
3.4 When using component-user data sheets to design activity space layouts, selection of the appropriate activity dimensions is essential for economy and efficiency. Selection should be based on careful consideration of the frequency, duration, timing and importance of the activities and also the number of people involved. A typical example of the use of a sink showing activity dimensions provided by the component user data sheet is shown below.



Examples

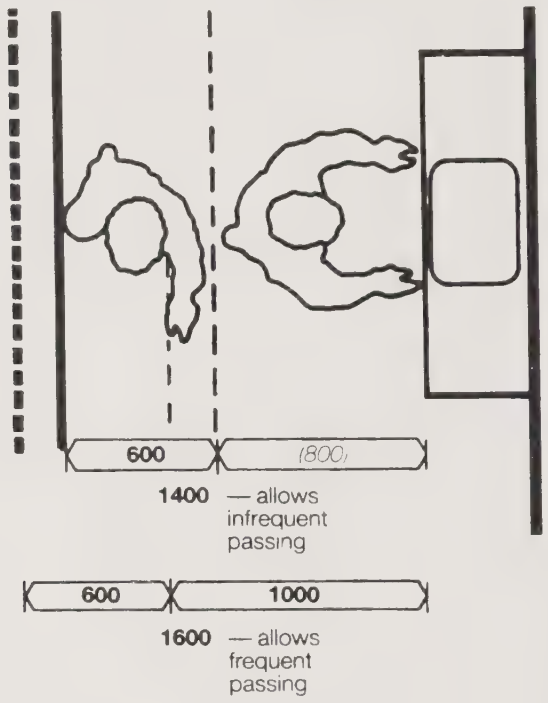
3.5 The following worked examples show the sink being used in three different situations and show how the appropriate dimensions would be selected but do not necessarily relate to this particular Building Note. These examples have been simplified; additional factors such as the movement of mobile equipment may also be critical:

a. if the room is normally occupied by one person only, the 1000 workspace dimension may be applicable. An (*800*) restricted dimension should not be used, as this dimension is only applicable where two user spaces are adjoining, not where an individual user space is bounded by a wall or solid obstruction. If the person using the sink stops work and stands close to the sink, 1000 is also sufficient space to allow a second person to pass, that is, 600 + 400;



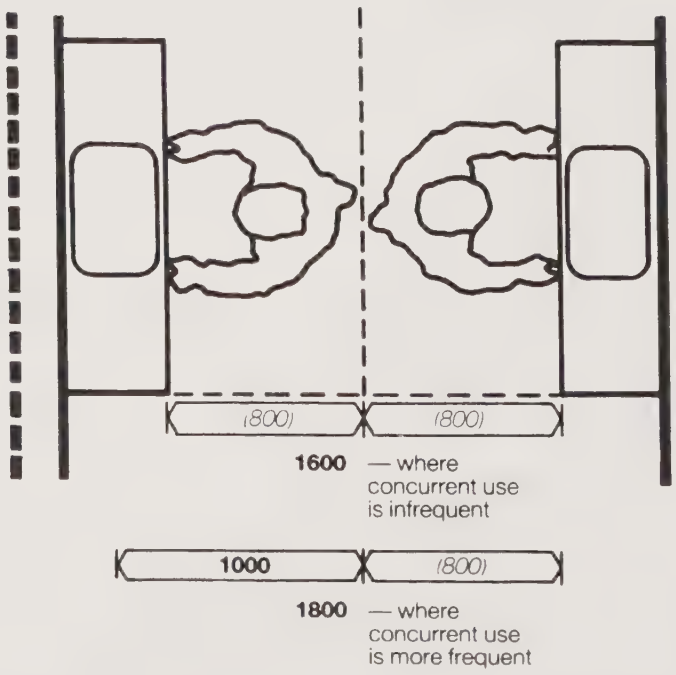
b. if space is required to allow a person to pass, without the user of the sink stopping work, then the 600 passing dimension is added to the workspace dimension. If passing is infrequent, then temporary restriction of the sink user's space may be acceptable; this gives an overall dimension of 600 + (800) = 1400.

If passing is frequent, and restriction of the sink user's space is not acceptable, the overall dimension is 600 + 1000 = 1600;



c. where space has to be provided to enable two sinks to be used concurrently, the overall dimension between sinks will be the sum of the workspace dimensions – for example, if concurrent use is infrequent and of short duration then (800) + (800) = 1600 may be acceptable. Alternatively 1000 + (800) = 1800 allows the full workspace for one sink user and restricted space for the second user, where concurrent use of the sinks is more frequent.

3.6 **Note.** The passing of a third person between the two sink users may also be critical in this example. Where the sinks are staggered 1400 may be acceptable, as in example (b) above.



4.0 Engineering services

Introduction

4.1 This chapter describes the engineering services contained within bathroom, shower and toilet areas. The central distribution systems serving these and other areas, which are normally installed in the voids above suspended ceilings, are not described.

4.2 It should be borne in mind that bathroom, shower and toilet areas form an integral part of a department and, therefore, the engineering services will also form an integral part of that department's system.

Model specifications

4.3 The National Health Service Model Engineering Specifications are sufficiently flexible to reflect and respond to local needs. The cost allowance is based on the quality of material and workmanship described in the relevant parts of the specifications.

Economy

4.4 Engineering services are a significant proportion of the capital cost, and remain a continuing charge on revenue budgets. The project design engineer should therefore ensure:

a. economy in their initial provision, consistent with meeting the functional requirements of the space;

b. the optimum benefit from the total financial resources these services are likely to absorb during their lifetime.

4.5 Where alternative design solutions are available, the consequential capital and running costs should be compared using the discounting techniques described in the Capital Investment Manual.

4.6 In view of the increasing cost of energy, the project team should consider the economic viability of heat recovery systems. Designers should ensure that those engineering services which use energy do so efficiently.

Activity data

4.7 Environmental and engineering technical data and equipment details are described on the Activity Data Sheets listed in Appendix 4 of this HBN. These should be referred to for space temperatures, lighting levels, outlets for power, telephones, details of equipment, etc.

Safety

4.8 Section 6 of the Health and Safety at Work etc Act 1974, as amended by Schedule 3 of the Consumer Protection Act 1987, imposes statutory duties on all persons who design, manufacture, import, supply, install or erect "articles for use at work". One of the requirements of this Section is to ensure, "so far as is reasonably practicable", that the article is designed and constructed so that it will be safe and without risks to health at all times when it is being set, used, cleaned or maintained by a person at work. All parts of engineering systems are covered by the term "articles for use at work".

Fire safety

4.9 The project team should familiarise themselves with Firecode, which contains the Department's policy, together with technical guidance, regarding fire safety in hospitals and other NHS premises. In addition, the Fire Practice Note series of documents provides specialist guidance on individual aspects of fire precautions.

Noise

4.10 Excessive noise and vibration from engineering services (whether generated internally or externally and transmitted to individual areas), or noise from other sources (for example, speech, which may be transmitted by the ventilation system), can easily cause discomfort, both to patients and staff. The limits and means of control advocated in Hospital Design Note 4 (including its revisions), together with the means of control contained in Engineering Data Sheet DH1, should facilitate the provision of an acceptable acoustic environment.

Space for plant and services

4.11 The space allocation for plant and services should accommodate:

a. an easy and safe means of access, protected as far as possible from unauthorised entry;

b. the enabling of frequent inspection and maintenance (sufficient access panels should be provided for this purpose);

c. for the eventual removal and replacement of plant.

4.12 Recommended spatial requirements for mechanical, electrical and public health engineering services are contained in HTM 2023. The information in this HTM is specifically intended for use during the initial planning stages, when precise dimensional details of plant are not available.

4.13 The distribution of mechanical and electrical services to their final intended positions of use should, wherever possible, be concealed within walls and above ceilings. Heat emitters should be contained within a 200 mm-wide perimeter zone under window sills, and the critical dimension should be measured from the boundary of this zone.

4.14 This perimeter zone includes the floor area occupied by minor vertical engineering ducts, and is included in the building's circulation allowance.

Access to control and isolation devices

4.15 Devices for the control and safe isolation of engineering services should be:

a. located in circulation areas rather than working areas;

b. protected against any unauthorised operation;

c. clearly visible and accessible, where intended for operation by the department's staff.

Engineering commissioning

4.16 Engineering services should be commissioned in accordance with the validation and verification methods identified in the current versions of the relevant HTMs. Those engineering services for which a specific HTM is not currently available should be commissioned in accordance with HTM 17. This HTM also outlines the requirements which should be included in the contract documents. Flow measurement and proportional balancing of air and water systems require adequate test facilities to be incorporated at the design stage. Further guidance is contained in a series of commissioning codes published by the Chartered Institute of Building Services Engineers.

MECHANICAL SERVICES

Heating

4.17 Spaces heated by low-pressure hot water systems should use radiators of the low surface temperature type. Surface temperatures should not exceed 43°C. Any exposed hot water pipework which is accessible to touch should be insulated. Further guidance is contained in '"Safe" hot water and surface temperatures'.

4.18 Radiators should normally be located under windows or against exposed walls, with sufficient clear space between the top of the radiator and the window sill to prevent curtains reducing the heat output. There should be adequate space underneath to allow cleaning machinery to be used. Where a radiator is located on an external wall, back insulation should be provided to reduce the rate of heat transmission through the fabric of the building.

4.19 Radiators should be fitted with thermostatic radiator valves, which should be of robust construction and selected to match the temperature and pressure characteristics of the heating system. The thermostatic head, incorporating a tamper-proof facility for pre-setting the maximum space temperature, should be controlled via a sensor, located integrally or remotely as appropriate. In order to provide frost protection at its minimum setting, the valve should not remain closed below a certain defined temperature.

4.20 The flow temperature to heating appliances may be scheduled in accordance with the external ambient temperature.

Ventilation

4.21 Wherever possible, spaces should be naturally ventilated. However, toilets, bathrooms and showers will require a mechanical extract system which should normally operate continuously throughout the day and night. A dual-motor fan unit with an automatic changeover facility should be provided. Mechanical ventilation systems should promote the movement of air from "clean" to "dirty" areas, where these can be defined. The design should allow for an adequate flow of air into any space having only mechanical means of extract ventilation, via transfer grilles in doors or walls. Such an arrangement, however, should avoid the introduction of untempered air and should not interfere with the requirements of fire safety or privacy.

4.22 Mechanical ventilation should ensure that both supply and extract systems are in balance, taking due account of infiltration, where appropriate.

4.23 Fresh air should be introduced via a low-velocity system, and should be tempered and filtered before being distributed via high level outlets. Diffusers and grilles should be located to achieve uniform air distribution within the space.

4.24 External discharge arrangements for extract systems should be protected against any back pressure due to wind velocity, and should be located to avoid reintroduction of stale air into this or adjacent buildings through air intakes and windows.

4.25 Further detailed guidance is contained in HTM 2025.

Hot and cold water services

4.26 The domestic hot water supply should be taken from the general hospital calorifier installation at a minimum outflow temperature of 60°C ± 2.5°C and distributed to all outlets such that the return temperature at the calorifier is not less than 50°C.

4.27 Surface temperature guidance is contained in '"Safe" hot water and surface temperatures'.

4.28 The requirements for the control of legionellae bacteria in hot and cold water systems are set out in HTM 2040.

4.29 All cold water pipework, valves and fittings should be economically insulated and vapour-sealed, to protect against frost, surface condensation and heat gain.

4.30 Further guidance on the design and installation of hot and cold water supply and distribution systems is contained in HTM 2027.

ELECTRICAL SERVICES

Electrical installation

4.31 The installation should comply in all respects with BS7671, 'Requirements for Electrical Installations', and HTM 2007.

4.32 Wiring should be concealed using PVC insulated cable and screwed steel conduit or trunking, but, in certain circumstances, mineral insulated metal-sheathed cables may be necessary. External installations should use PVC insulated cables in galvanised screwed steel conduit with waterproof fittings.

Electrical interference

4.33 Care should be taken to avoid mains-borne interference and electrical radio frequency interference affecting physiological monitoring equipment, computers and other electronic equipment used here or elsewhere on the site.

4.34 Fluorescent luminaires should comply with BS5394.

4.35 Further guidance on the avoidance and abatement of electrical interference is contained in HTM 2014.

Lighting

4.36 Colour finishes and lighting should be co-ordinated, to create a calm and welcoming atmosphere. Practical methods are contained in the CIBSE Lighting Guide LG2 'Hospitals and Health Care Buildings'.

4.37 Architects and engineers should collaborate to ensure that decorative finishes are compatible with the colour-rendering properties of the lamp and that the spectral distribution of the light source is not adversely affected.

4.38 Luminaires should be manufactured and tested in accordance with the requirements specified in the relevant sections of BS4533. Their location should afford ready access for lamp changing and maintenance.

4.39 Generally, luminaires should be fitted with fluorescent lamps. Luminaires which are used only intermittently and infrequently may be fitted with compact fluorescent or incandescent lamps.

4.40 Safety lighting should be provided in accordance with HTM 2011 and BS5266.

Emergency electrical supplies

4.41 Guidance on emergency electrical supplies is contained in HTM 2011.

Patient/staff and staff/staff call systems

4.42 Guidance on patient and staff call systems is contained in HTM 2015.

Internal drainage

4.43 The primary objective is to provide an internal drainage system which:

a. uses the minimum of pipework;

b. remains watertight and airtight at its joints and connections;

c. is sufficiently ventilated to retain the integrity of water seals.

Design parameters

4.44 The general design for engineering services should comply with the relevant British Standards and Codes of Practice, including BS5572 and the current building regulations. Recommendations for spatial and access requirements for public health engineering services are contained in Engineering Data Sheet EA5.

4.45 The gradient of branch drains should be uniform, and adequate to convey the maximum discharge to the stack without blockage. Space considerations, as well as practical considerations such as available angles of bends, junctions and their assembly, usually limit the minimum gradient to about 1:50 (20 mm/m). For larger pipes, for example those 100 mm in diameter, the gradient may be less, but this will require workmanship of a high standard if an adequate self-cleaning flow is to be maintained. It is not envisaged that pipes larger than 100 mm in diameter will be required within inter-floor or ground-floor systems serving the building.

4.46 Provision for inspection, rodding and maintenance should ensure "full bore" access, and be located to minimise disruption or possible contamination. Manholes should not be located within these areas.

5.0 Cost information

Introduction

5.1 For all types of health building it is clearly of vital importance that building and running costs should be kept as low as possible, consistent with acceptable standards. Within this general context, Health Building Notes provide guidance on the design of a range of accommodation for health buildings which the Department, in conjunction with the National Health Service, recommends for the provision of any given service.

5.2 While using the information given in this section, it is important to note that this information is intended to be used as a standard item for insertion into a separate functional unit (such as an A and E Department) as required.

Works cost

5.3 To prepare an estimate of the works cost for a scheme, reference should be made to the Capital Investment Manual (England and Wales; or Health Building Procurement guidance in Scotland). The total cost allowance for a scheme is then derived by aggregating the cost of the functional units, the Essential Complementary Accommodation (ECA) and the Optional Accommodation and Services (OAS), as appropriate to the particular scheme.

5.4 The cost allowances cover the building and engineering requirements set out in Volumes 1 to 3 of this Note. In costing the following common spaces, it has been assumed that these areas will be incorporated into a two-storey hospital or other health building where the shared use of engineering services and systems is envisaged.

Functional units

5.5 The Schedule of Accommodation provided at the end of this section takes the form of a combined Schedule for the first three volumes of this Note. It does not in itself comprise a functional unit, but is to be used as a "menu" of standard items, which can then be inserted into the accommodation schedule for other functional units. This represents an attempt to standardise future HBNs.

Toilets

5.6 This schedule consists of a range of the most common options available for the formation and calculation of costs for any given functional unit.

Bathrooms

5.7 This schedule consists of two standard types of bathroom, either of which can be inserted into a given functional unit as required.

Showers

5.8 This schedule consists of a range of the most common options available for the formation and calculation of costs for any given functional unit.

Dimensions and areas

5.9 In determining spatial requirements for a health building, the essential factor is not the total area to be provided but its critical dimensions – that is, those dimensions critical to the efficient functioning of the activities which are to be carried out at that location. To assist project teams in preparing detailed design solutions for the relevant rooms and spaces, studies – in the form of critical dimensions – have been carried out in order to establish dimensional requirements.

5.10 For development planning purposes, and at the earliest stage of design, it may be convenient for designers to have data available which will enable them to make an approximate assessment of the sizes involved. For this reason, the measurements prepared for the purpose of establishing the cost allowances are included in the Schedule of Accommodation at the end of this section.

5.11 It is emphasised that the measurements given **do not** represent recommended sizes, nor are they to be regarded in any way as specific individual entitlements, but rather purely as ergonomic guidelines.

Circulation areas

5.12 Space for circulation areas has **not** been included within the schedule shown; this will be added to the overall functional unit areas, which have been calculated elsewhere and presented within the HBN relevant to that particular unit. Allowances have been included within the Schedule of Accommodation for the "planning provision", "engineering zone" (adjacent to the external walls), and any small ducts and partitions.

Communication routes

5.13 No allowance for staircases and lifts, or plantrooms, is included in these Schedules of Accommodation. These areas are dealt with under the particular overall functional unit to which they belong, standard sizes of which are included within HBN 40, Volume 4.

Engineering services

5.14 The following engineering services, as described in Chapter 4 and exemplified in the Activity Data, are included in the cost allowances. Primary engineering services are assumed to be conveniently available at the boundary of the toilet, bathroom or shower space.

a. mechanical services:

   (i) heating: low pressure hot water heating system with thermostatic radiator control, maximum touch temperature 43°C;

   (ii) ventilation: mechanical extract;

   (iii) cold water service: supplied to service points;

   (iv) hot water service: supplied to service points with thermostatic mixing valves at outlets;

b. electrical services:

   (i) lighting system: general lighting;

   (ii) power system: power to fixed equipment; supplementary equipotential earth bonding; emergency lighting;

   (iii) staff/staff and patient/staff call system.

HBN 40 – Common activity spaces: Volumes 1 – 3 Generally

Schedule of Accommodation

Para no	Common activity space	Space area m²	Qty	Planning and engineering area	Total area m²
N/A	**Toilets**				
	Type 1: Fully ambulant WC with rinse-basin	2.13	1	0.17	2.30
	Type 2: Ambulant, semi & assisted ambulant with rinse-basin – frontal access	2.70	1	0.22	2.92
	Type 3: Ambulant, semi & assisted ambulant with rinse-basin – lateral access	3.08	1	0.25	3.33
	Type 4: Independent wheelchair users with rinse-basin (doubles as "specimen" WC)	4.64	1	0.39	5.23
	Type 5: Independent & assisted wheelchair users with rinse-basin	4.47	1	0.36	4.83
	Type 6: Dual assisted wheelchair users with rinse-basin	5.52	1	0.45	5.97
	Type 7: WC with washbasin & bidet	3.88	1	0.32	4.20
N/A	**Bathrooms**				
	Type 1: Ambulant, assisted ambulant & independent wheelchairs users with WC & personal washing facility	8.70	1	0.71	9.41
	Type 2: Assisted patients, use of hoist, WC & personal washing facility	16.00	1	1.30	17.30
N/A	**Showers**				
	Type 1: Partially capable users with assistance, wheelchair users, with WC & wash basin (linear layout)	7.29	1	0.59	7.88
	Type 2: Partially capable users with assistance, wheelchair users, with WC & wash basin (non-linear layout)	7.20	1	0.59	7.79
	Type 3: Shower/WC & bidet	6.48	1	0.53	7.01
	Type 4: Ambulant staff user	2.64	1	0.22	2.86

6.0 Example layouts

6.1 Ambulant people

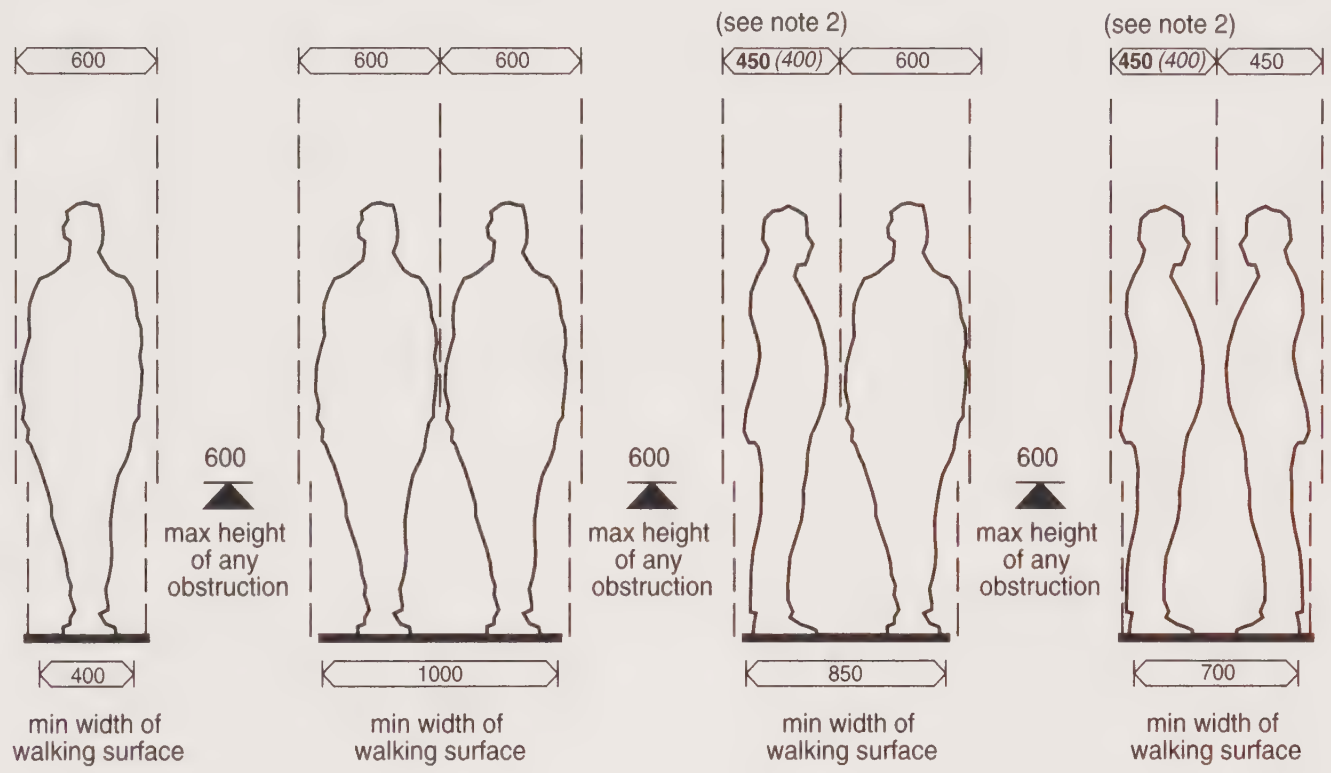
The data sheets show space requirements for people walking independently, with assistance and with walking aids. The space requirements for people walking may be a critical factor in determining corridor width where pedestrian traffic is particularly heavy, and especially in areas where people are frequently assisted and use walking aids. Space requirements are given for various types of walking aids; generally it will be necessary to allow for use of the most space-consuming types – that is, walking-frames or shoulder crutches.

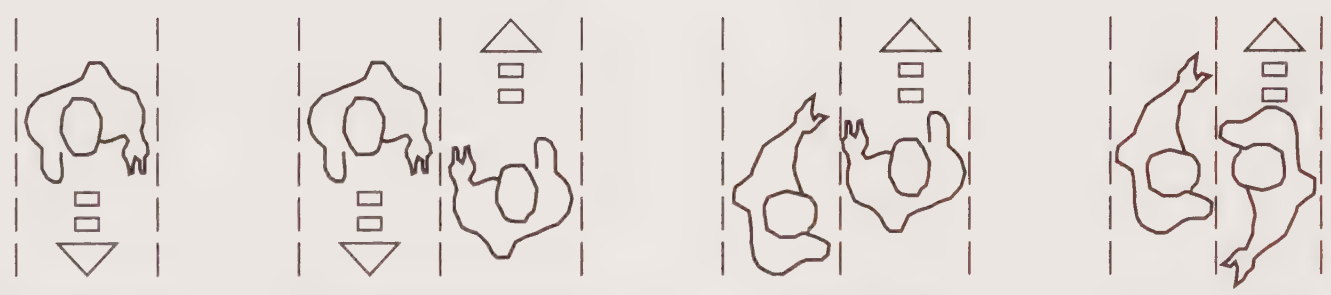
Activities:
Walking - circulating and passing

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Person 1

Users:
Fully ambulant adults





1 person walking | 2 persons walking or passing | 2 persons passing (1 standing aside) | 2 persons passing (1 standing aside 1 sidestepping)

Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Corridor widths: dimensions are shown for lanes of pedestrian traffic assuming travel distances of over 1500. Lane dimensions are not necessarily min. corridor widths. This applies particularly to 1 person walking and especially where the travel distance exceeds 2500 where an additional allowance of 100 should be provided to accommodate the normal oscillatory movements of persons walking.

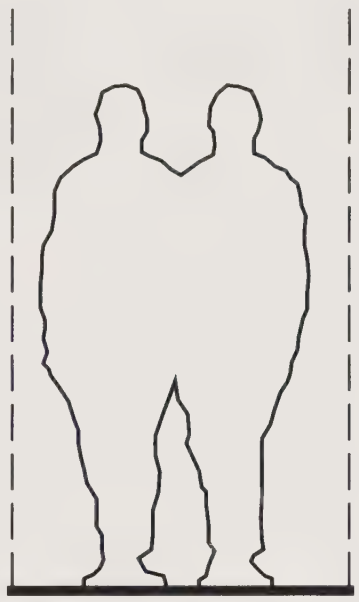
2. Restricted passages: restricted side-stepping action is just possible at 450 but not at 400. 6 or 7 sidesteps are a reasonable tolerance max. - 2500 max. restricted passage length but beyond this the difficulty and inconvenience becomes unacceptable even in very infrequently accessed situations. Ideally sidestepping should be limited to 3 or 4 paces, i.e. a max. restricted passage length of approx. 1000.

Activities:
Walking with assistance.

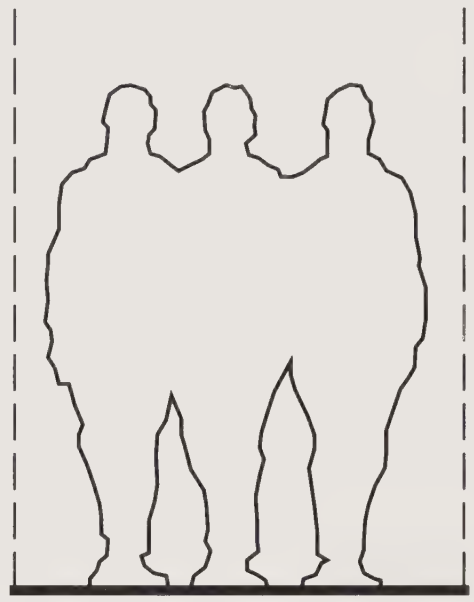
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Person 2

Users:
Semi ambulant adults with assistance.

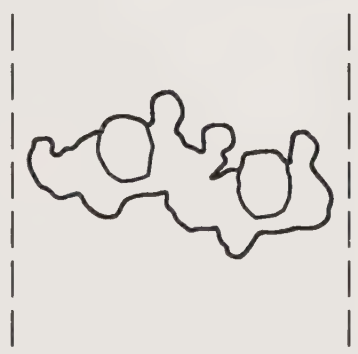


1200 *(1000)*

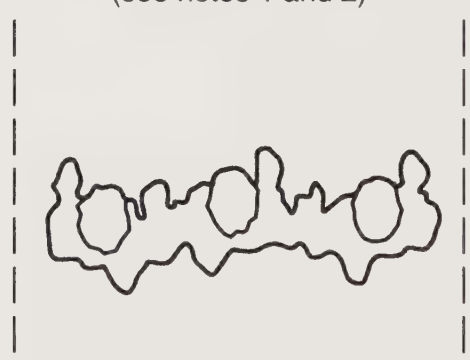


1600 (1400)

(1500) - where assisted person is very debilitated (see notes 1 and 2)



WALKING ASSISTED BY ONE PERSON



WALKING ASSISTED BY TWO PERSONS

Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Dimensions - un-bracketed dimensions are preferred minima for widths of lanes of pedestrian traffic assuming a total travel distance of more than 1500 - bracketed dimensions are restricted minima applicable to movement through door openings or similar where the travel distance does not exceed 1500 (the bracketed dimensions should not be used for normal pedestrian traffic lane requirements).

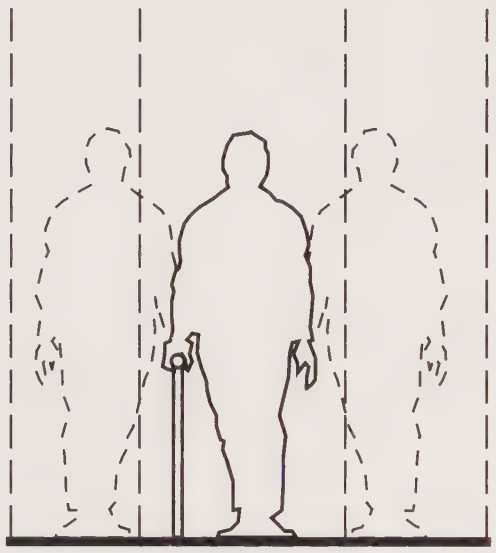
2. Corridor widths - the dimensions shown are lane dimensions and not min. corridor widths. Where either walking with one or two assistants is the only critical criterion in determining a corridor width, and the travel distance exceeds 2500, it is recommended that an additional allowance of at least 100 be provided to accommodate the normal oscillatory movements of persons walking.

Activities:
Walking, with walking sticks or tripods.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Person 3

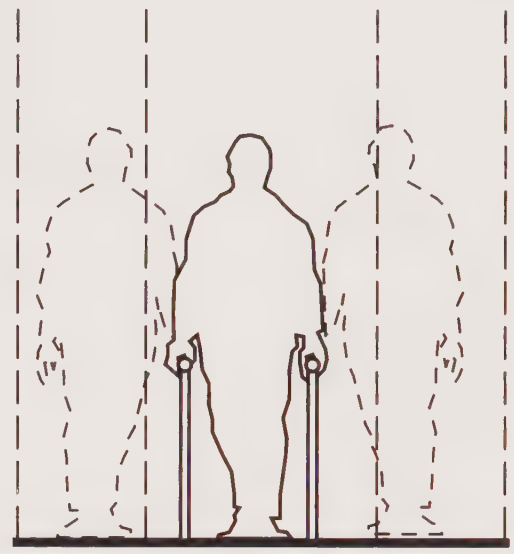
Users:
Semi ambulant, independent or assisted.



800 *(750)*
one stick (see note 3)

1350 *(1300)*
one stick and one assistant
(see note 1)

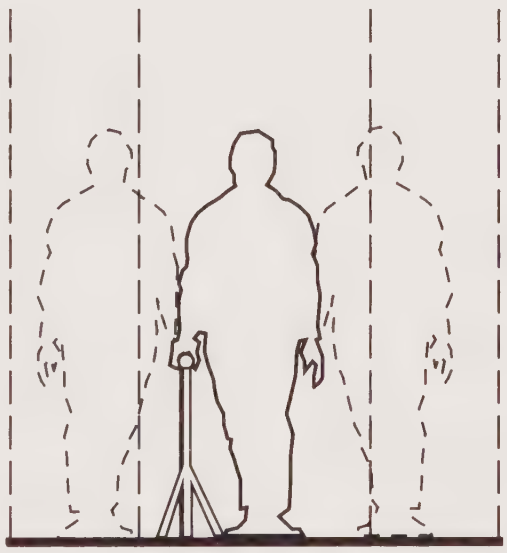
1850 *(1750)*
one stick and two assistants
(see note 1)



900 *(800)*
two sticks (see note 3)

1400 *(1350)*
two sticks and one assistant
(see note 1)

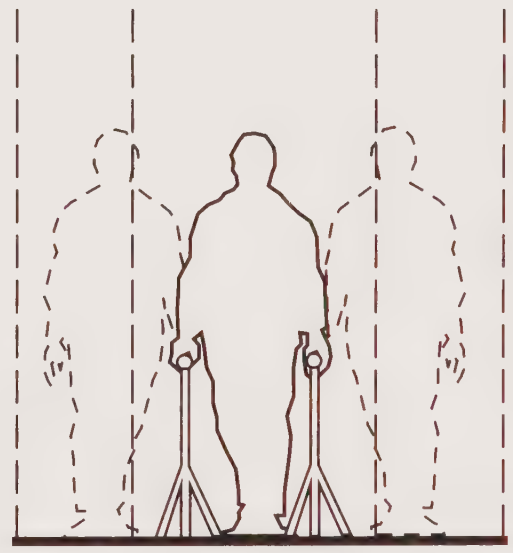
1900 *(1800)*
two sticks and two assistants
(see note 1)



900 *(850)*
one tripod (see note 3)

1400 *(1350)*
one tripod and one assistant
(see note 1)

1900 *(1850)*
one tripod and two assistants
(see note 1)



950
two tripods (see note 3)

1450 *(1400)*
two tripods and one assistant
(see note 1)

1900 *(1850)*
two tripods and two assistants
(see note 1)

Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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Bracketed dimensions (assisted users)

1. Space for assisting is slightly restricted and not recommended in heavily used areas.

2. Patients can be assisted from behind and/or in front when passing through an opening.

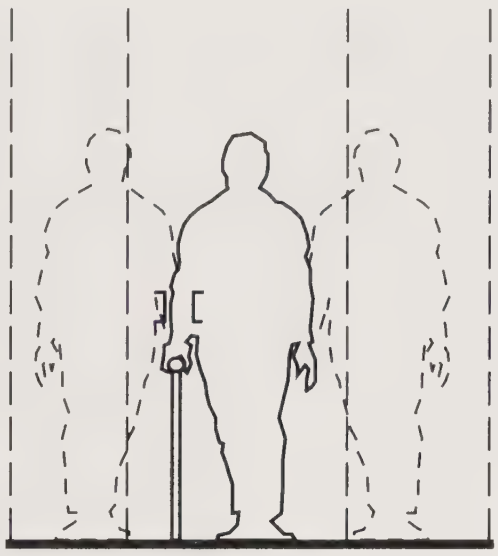
3. Independent circulation - bracketed dimension is satisfactory for short travel distances only.

Activities:
Walking with the aid of elbow or shoulder crutches and one or two assistants.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Person 4

Users:
Semi ambulant, independent or assisted.



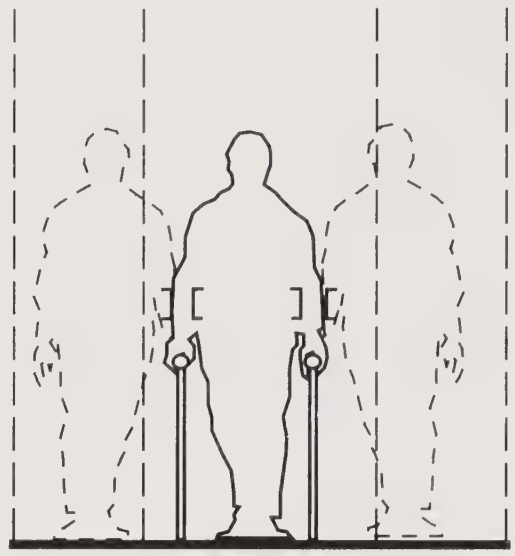
850

1400 *(1350)*

one elbow crutch and one assistant (see note 1)

1850 *(1750)*

one elbow crutch and two assistants (see note 1)



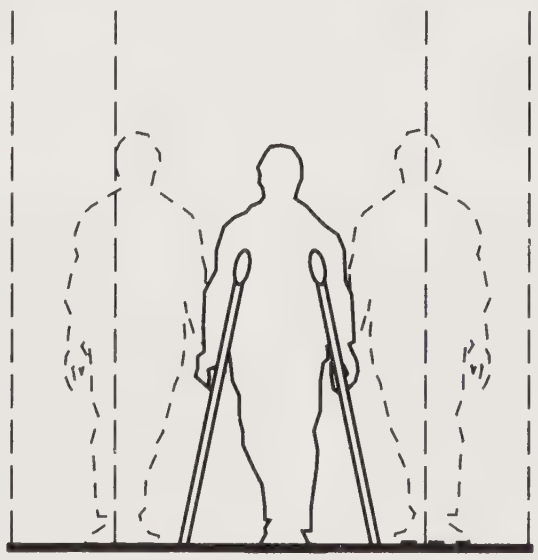
900

1400 *(1350)*

two elbow crutches and one assistant (see note 1)

1900 *(1800)*

two elbow crutches and two assistants (see note 1)



1200 *(1000)*

two shoulder crutches

1600 *(1500)*

two shoulder crutches and one assistant (see note 1)

2000 *(1800)*

two shoulder crutches and two assistants (see note 1)

Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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Bracketed dimensions (assisted users).
1. Space for assisting is slightly restricted and not recommended in heavily used areas.

2. Patients can be assisted from behind and/or in front when passing through an opening.

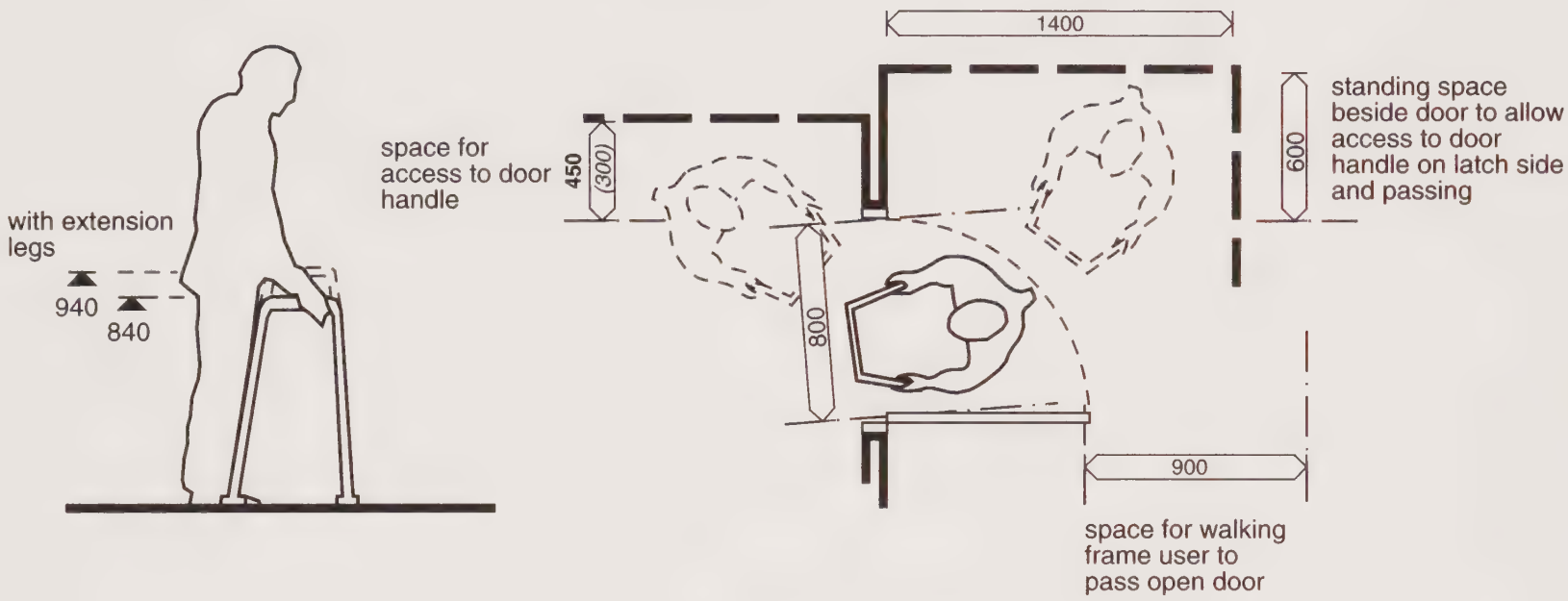
Activities:
Walking and passing through doors.
With walking frame (lightweight)

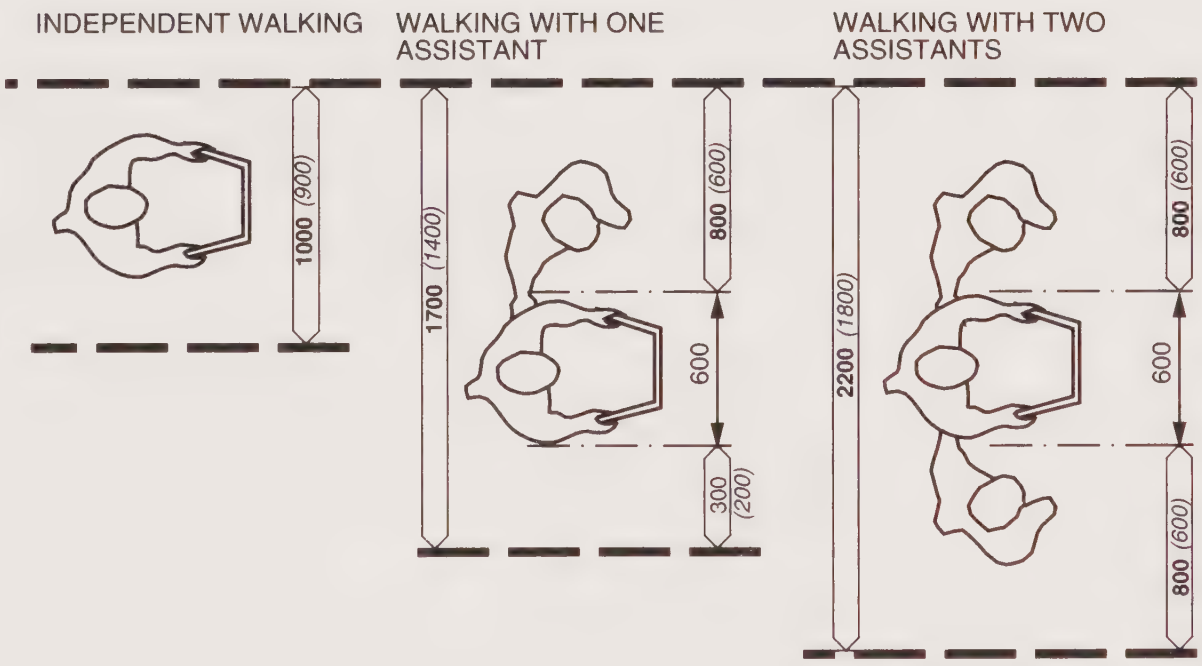
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Person 5

Users:
Semi ambulant, (including the elderly), independent or assisted.

SPACE FOR INDEPENDENT USER TO PASS THROUGH SINGLE LEAF DOOR





Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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6.2 Wheelchairs

The ergonomic data sheets in this section relate to standard 8L wheelchairs, which is one of the largest types most likely to be used. (Where larger specialised wheelchairs are used, additional space may be required.) The skill of the wheelchair user is an important factor in determining space requirements, therefore the dimensions given take into account the need to allow for the relatively high proportion of inexperienced wheelchair users who are likely to use health buildings.

Activities:
Straight movement of wheelchair.

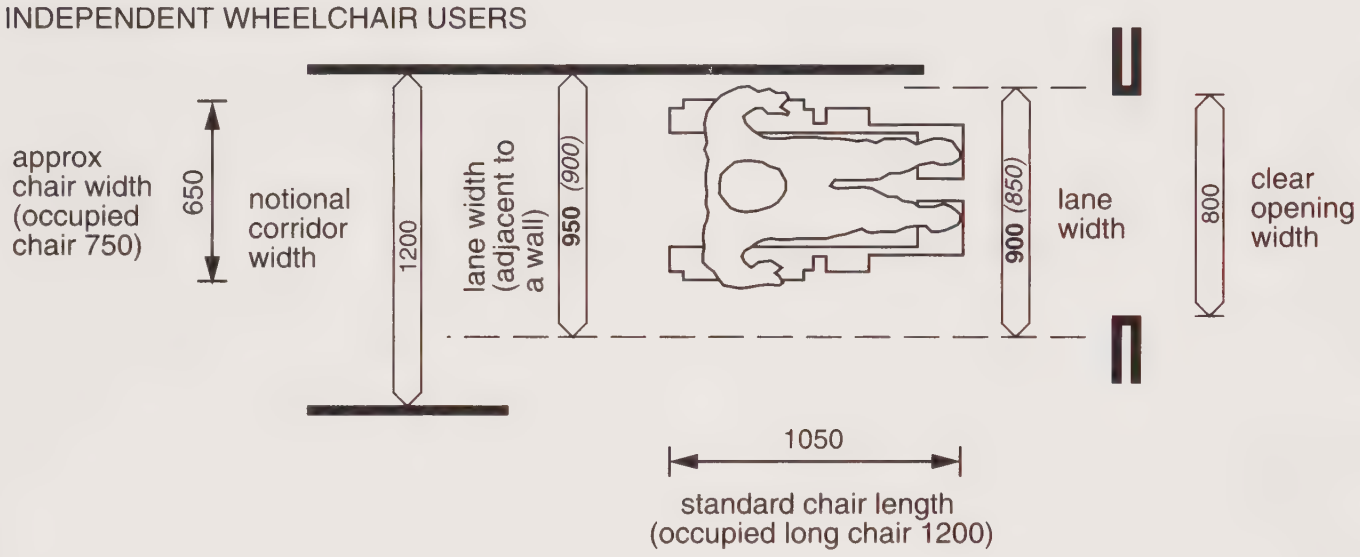
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Wheelchair 1

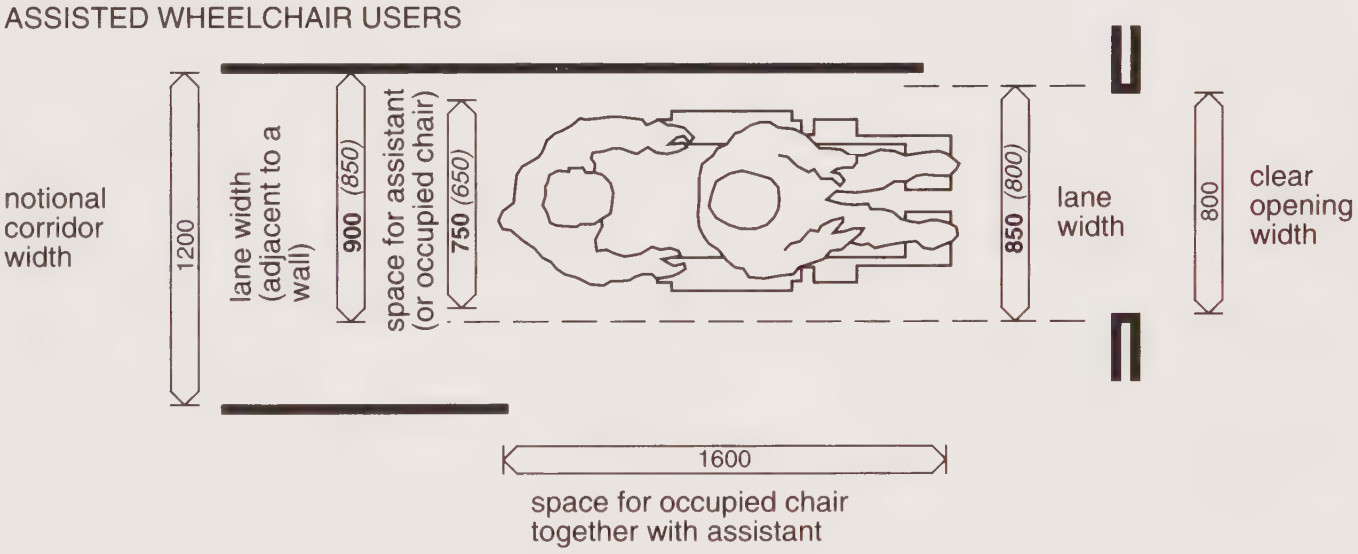
Standard DSA (8L) see note 1.

Users:
Non ambulant, assisted and independent wheelchair users.

INDEPENDENT WHEELCHAIR USERS



ASSISTED WHEELCHAIR USERS



Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

1. Component envelope shown will also accept most types of wheelchair. However, wheelchairs with elevated leg rests, extended footrests, headrests, reclining backs etc. may result in larger components and consequent space requirements.

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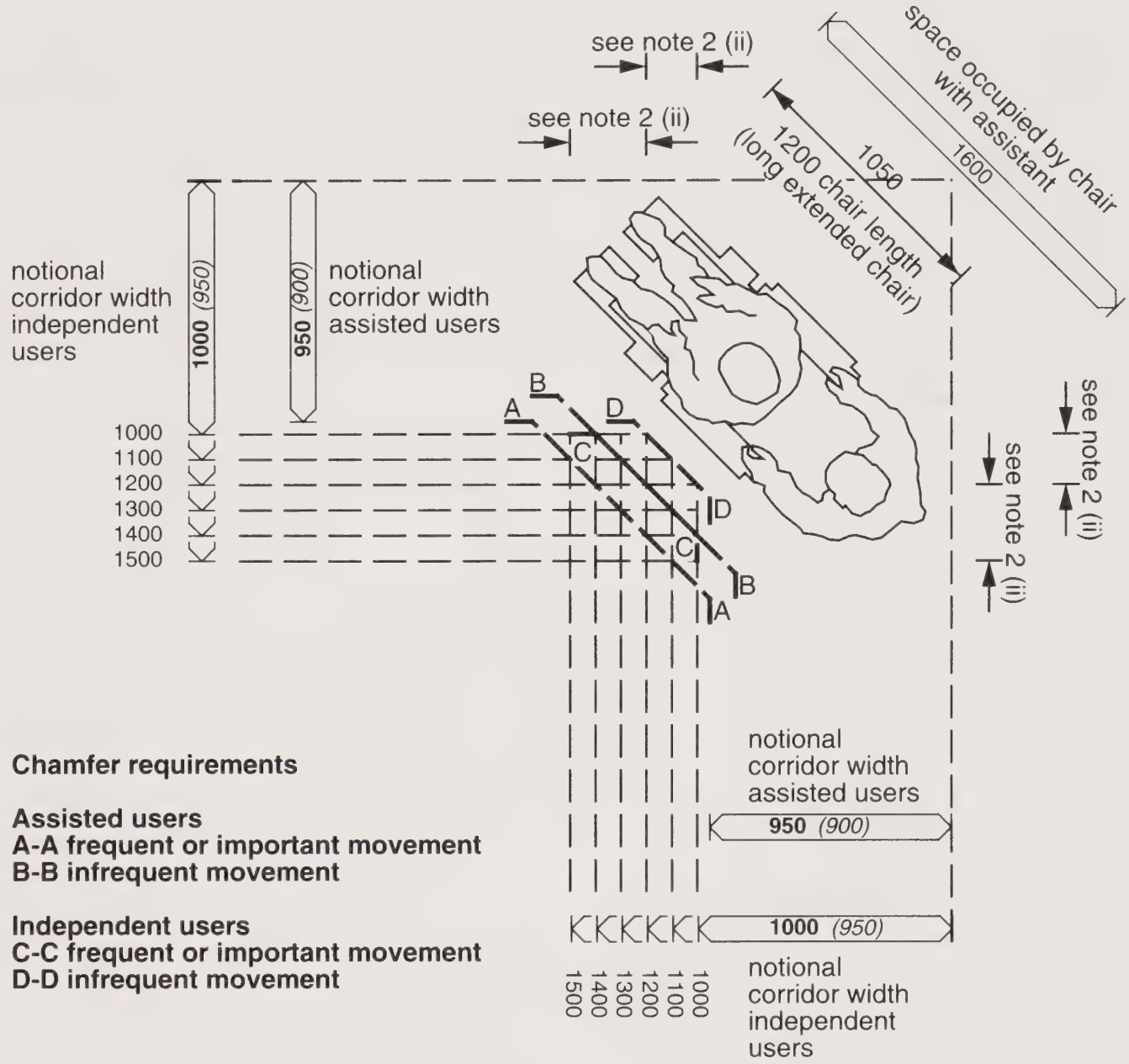
Activities:
Turning around a 90° bend.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Wheelchair 2

Standard DSA (8L) see note 1.

Users:
Non ambulant, assisted and independent wheelchair users.



Chamfer requirements

Assisted users
A-A frequent or important movement
B-B infrequent movement

Independent users
C-C frequent or important movement
D-D infrequent movement

Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Component envelope shown will also accept most types of wheelchair. However, wheelchairs with elevated leg rests, extended footrests, headrests, reclining backs etc. may result in larger components and consequent space requirements.

2. Dimensions of chamfers - examples:
i) Both notional corridors 1300 wide - no chamfer required for any category of wheelchair movement.
ii) Both notional corridors 1000 wide - with infrequent independent wheelchair movements - 200 x 200 chamfer required.
iii) 1100 notional corridor meeting 1200 notional corridor with frequent assisted wheelchair movement - 300 x 300 chamfer required.

Activities:
Movement of wheelchairs - turning through 90° & 180°

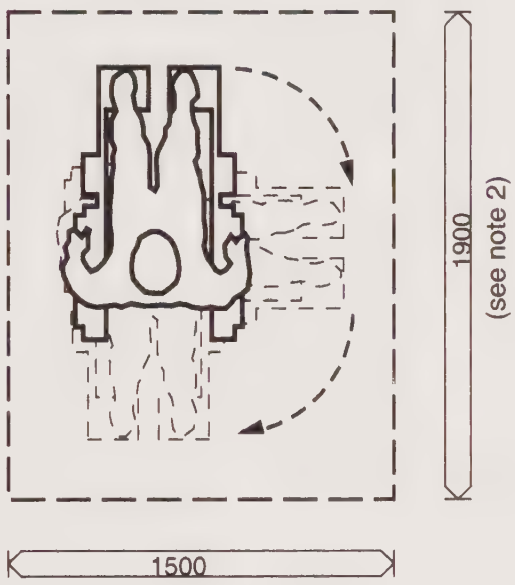
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Wheelchair 3

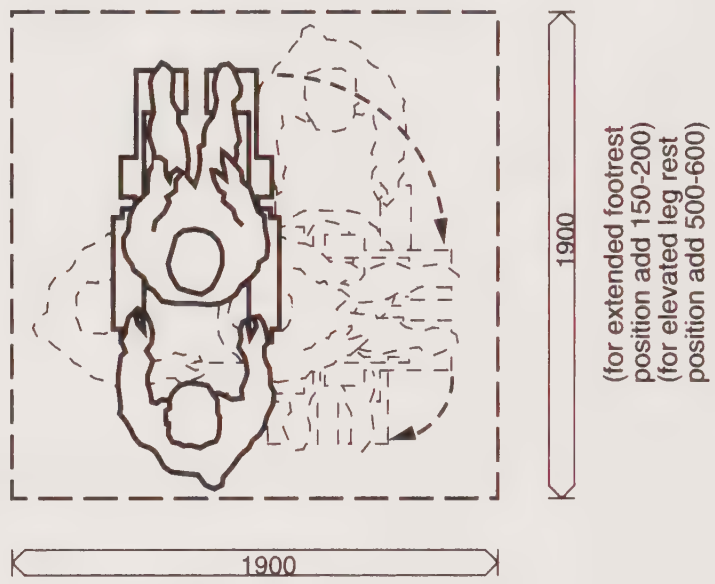
Standard DSA (8L).

Users:
Non ambulant, assisted and independent wheelchair users.

INDEPENDENT WHEELCHAIR USERS
TURNING THROUGH 180°

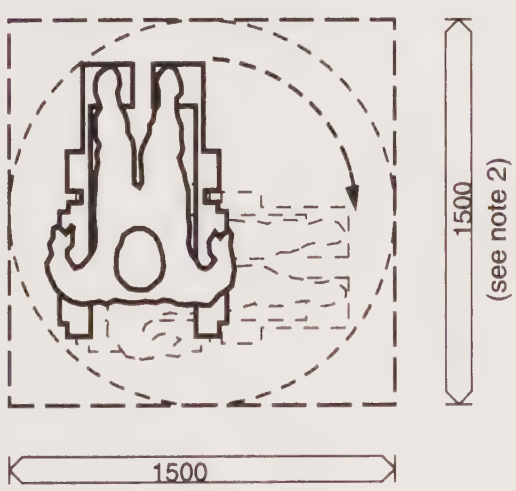


ASSISTED WHEELCHAIR USERS
TURNING THROUGH 90° & 180° (& 360°)



(for extended footrest
position add 100)
(for elevated leg rest
position add 350)

INDEPENDENT WHEELCHAIR USERS
TURNING THROUGH 90°



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Component envelope shown will also accept most types of wheelchair. However, wheelchairs with elevated leg rests, extended footrests, headrests, reclining backs etc. may result in larger components and consequent space requirements.

2. The 1900 x 1500 space is a recommended min. for general circulation areas. In other areas a clear space of 1500 diameter as part of a larger space which also contributes to the space available for wheelchair manoeuvrings generally satisfactory.

NB. A skilled wheelchair user can achieve 180° and 360° turn in a space of 1500 x 1500 but this is extremely difficult and therefore not possible for inexperienced or debilitated users.

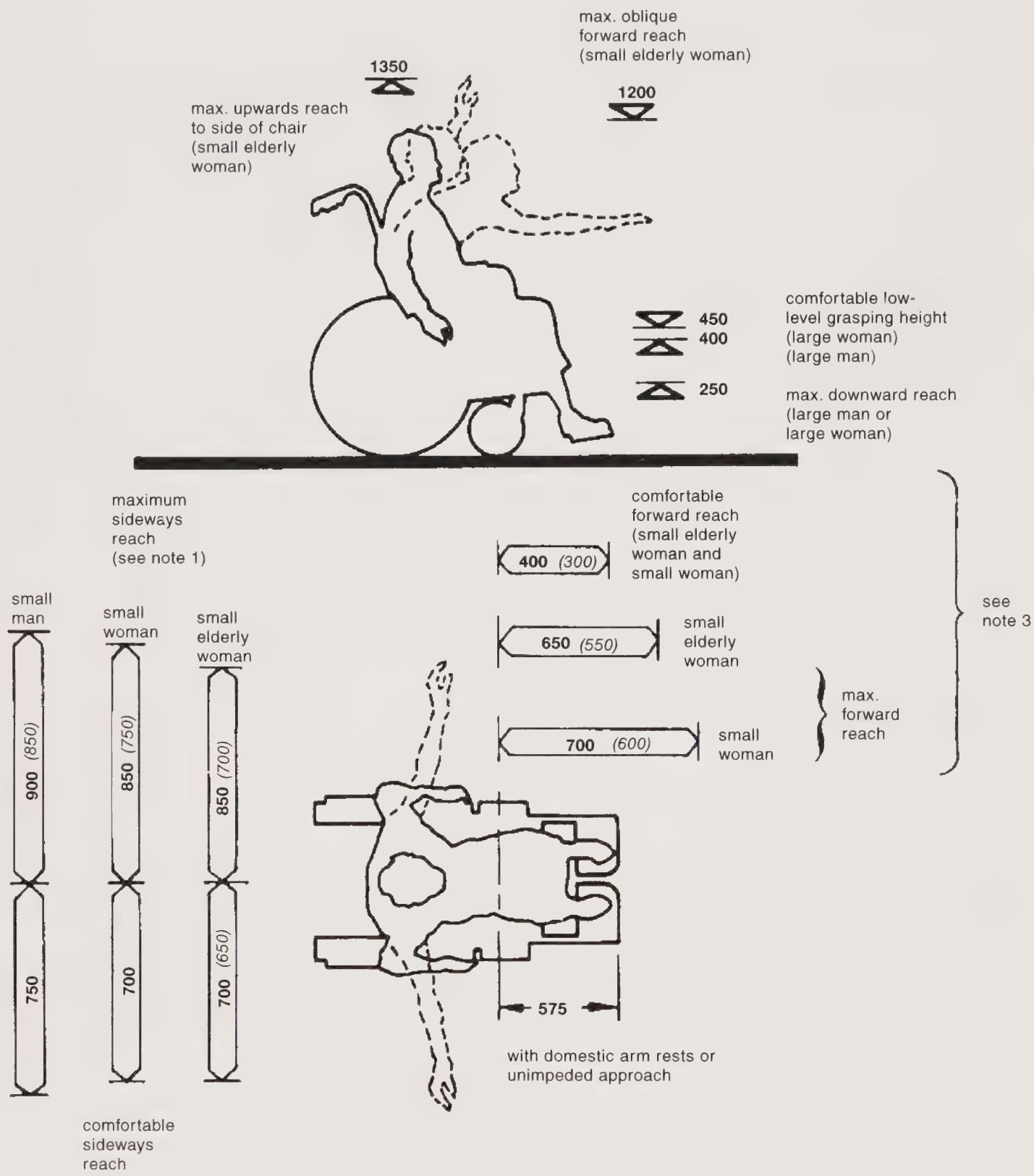
Activities:
Forward, sideways and upward reach.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Wheelchair 4

DSA Standard 8L

Users:
Non ambulant, assisted and independent wheelchair users.



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Restricted sideways reach dimensions also apply to wheelchair users whose balance is impaired and where trunk movement is consequently impaired.

2. Restricted forward reach dimensions apply where approach is impeded by wheelchair arm rests.

3. All forward reach dimensions assume that the user is not impeded in approach by either chair arm rests, worktop depth or other obstruction.

4. The recommended lowest shelf height for access to all items is 300mm.

5. See also separate data sheet, Wheelchair 5, dimensions and user eye levels.

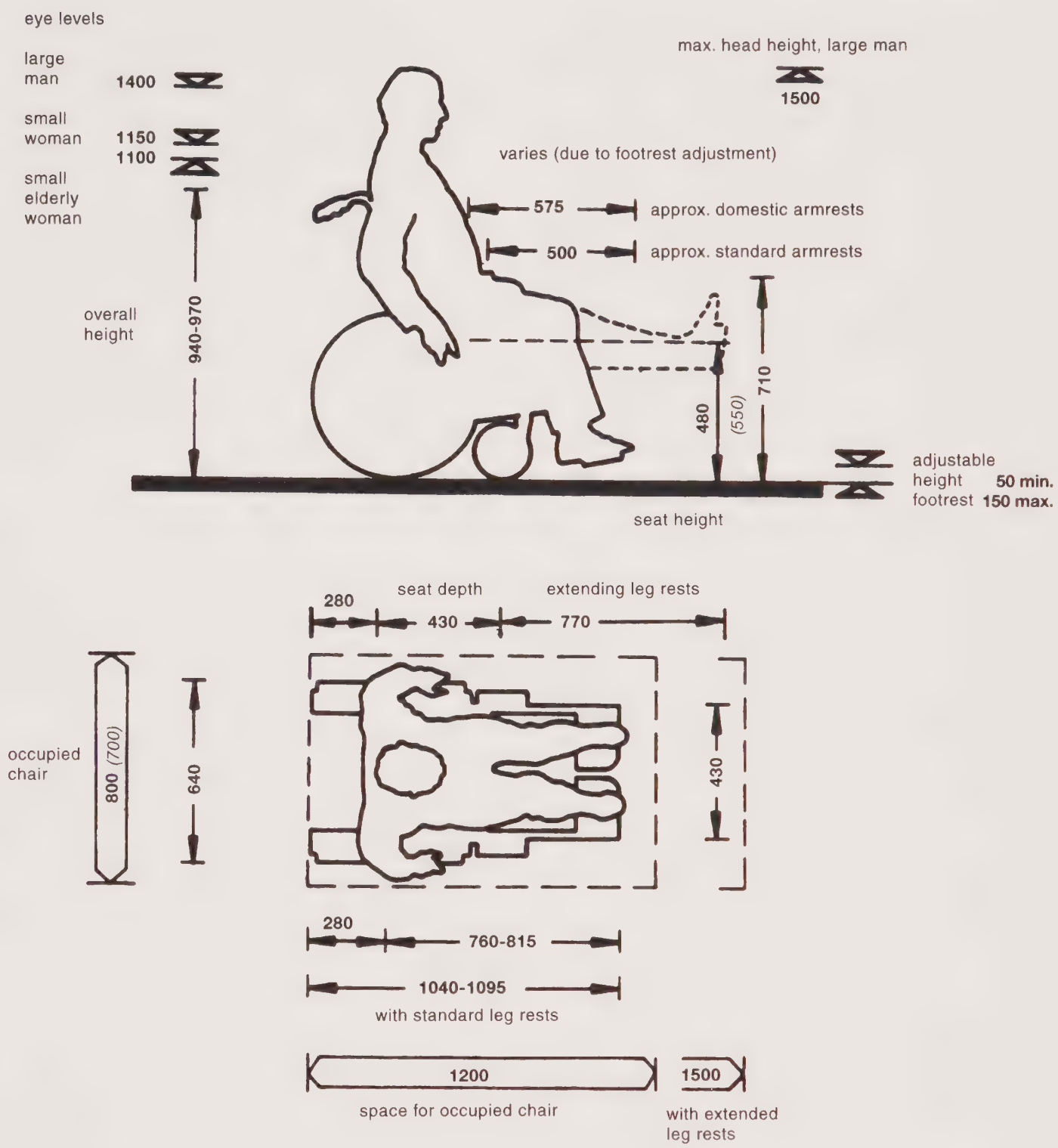
Activities:
Wheelchair dimensions and user eye levels.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Wheelchair 5

DSA Standard 8L

Users:
Non ambulant, assisted and independent wheelchair users.



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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6.3 Building approach

This set of ergonomic data sheets provides guidance for the design of various spaces and functional components which constitute the approach to the health building; these elements fulfil a particularly important role in creating a favourable impression for visitors, most of whom will be unfamiliar with the site and many of whom normally find visiting hospitals – in whatever capacity – a stressful experience.

A typical health building should ideally be on a level site, well lit (especially during non-daylight hours) and accessible to all categories of user. In view of the physical limitations of many users, there should be few (if any) obstructions to free movement to and through the building. On the building approach, therefore, any street furniture should be offset from the main pedestrian route; trees and shrubs should be positioned so that they do not constitute a hazard, and all branches should be kept trimmed. Specific guidance on such areas as car parks is given on the following pages.

Car parking

(Notes to ergonomic data sheets)

General considerations

1. When designing car parking facilities for a health building, the following points are of particular importance:

- the entry and exit points to parking facilities;
- space requirements for getting in and out of cars, also for loading/unloading of overnight bags, pushchairs, wheelchairs etc; it is important that parking spaces are large enough for drivers and passengers to get into and out of cars, and to reach the car boot, without being put at risk from traffic routes;
- directional information signing; and
- the use of ticket machines.

2. There may be a need for a variety of parking solutions to suit the different needs of the building's users, yet at the same time making economical use of the available space, as follows.

Easy access parking

3. A certain amount of kerbside parking is required near general entrance/departmental exit points, creating a safe, level area for these passenger loading/unloading zones.

4. Patients, staff and visitors (or their passengers) may have young children, or problems of mobility, and will need a larger parking space for activities such as fully opening the car doors, getting into and out of the car, unloading bags, securing young children in the vehicle, giving assistance, setting up pushchairs, etc. (See 'Car parking 1' data sheet.)

Parking for wheelchair users

5. Any patients, staff or visitors to the building (or their passengers) may have problems of mobility which require them to use a wheelchair. This may have to be unloaded, either independently or with assistance, from behind the driver's or passenger's seat or from the car boot and then be set up for transferring its occupant. This manoeuvre should be able to be carried out in safety without danger from other traffic and without damaging adjacent cars. (See 'Car parking 2' data sheet.)

Location of parking spaces

6. Car parking spaces can be located at right angles to, or diagonal to, the access road. Diagonal bays can give the driver or passenger more space to access, exit and retrieve items from the vehicle. Diagonal spaces are also easy to drive into when travelling in the same direction as the angle of the space, but difficult to manoeuvre in and out of if travelling in the opposite direction to the angle of the space. Careful consideration should therefore be given to the direction of traffic flow and the relative angle of the spaces provided (ideally between 45° and 60°). It may, however, be difficult for those people who have restricted mobility of trunk/neck to see sufficiently well to reverse into or out of such spaces, and thus right-angled spaces are generally more suitable for this purpose.

7. Adequate space separate to the main footpath should be provided so that pushchairs may be set up, or so that disabled people may easily transfer to or from wheelchairs, etc or get into and out of cars using sticks or crutches, without disrupting the main flow of pedestrians.

Number and type of spaces

8. The recommended minimum dimensions for a conventional parking space are 2400 x between 4800 and 6000 mm; however, for the special requirements outlined above, a recommended size for each type of parking space or bay is shown on the 'Car parking 1 and 2' data sheets on the following pages.

9. The number of each type of space to be provided in a health building car park is dependent on the type of departments it serves – for example, a hospital with a children's or elderly persons' care department is likely to need more of the easy access spaces in its car park. A hospital having a rehabilitation department may need more parking spaces for the dedicated use of wheelchair users. A hospital having none of these three departments will still require a number of each of these types of spaces, but the overall proportion will be different. For example:

- a staff car park for 100 cars should have 2 spaces for wheelchair users, 5–10 with easy access (for example, for those with mobility difficulties) and the remainder as conventional spaces;
- a patients' car park for 100 cars should have 2 spaces for wheelchair users, 35 with easy access (for those with mobility difficulties and/or children) and the remainder as conventional spaces;
- a car park serving a children's department, which accommodates a total of 50 cars, should have 2 spaces for wheelchair users and the remainder as "easy access" spaces;
- a car park serving a physiotherapy/occupational therapy/rehabilitation department, accommodating 30 cars, should have 10 spaces for wheelchair users and the remainder as "easy access" spaces.

Multi-storey car parks

10. The sizes of parking bays should conform to those recommended in paragraph 8 above and on the ergonomic

data sheets; the following additional factors should also be taken into account:

- the car park should be well lit, for safety;
- doors to lifts or stairways must be on the level, wide, and easy to open;
- direction signs to stairs, lifts, exits and emergency exits must be easily located, visible and readable. For further guidance, see paragraphs 20–22 below; also the relevant data sheets for external steps, lifts, doors, and signposting elsewhere in this volume; also the 'lifts' data sheets in Volume 4 of this Note);
- easy-access spaces and wheelchair users' spaces should be on the ground floor, and close to the pedestrian exit/s; if on all levels, they should be located adjacent to the lifts;
- if the different levels serve particular departments of the hospital, the bay sizes chosen should reflect this – that is, wheelchair users' spaces should be closest to exits, the "easy access" spaces next closest, and conventional spaces in the remaining bays;
- panic/alarm buttons should be provided at regularly-spaced intervals, and in prominent positions, throughout the car park.

11. When designing multi-storey car parks for health buildings, it is essential to avoid any routes to lifts/stairs via steep ramps, or via steps or a platform at the door to the lift or stairway area, and to ensure that any such access routes avoid crossing traffic routes wherever possible.

Payment for parking

12. Ticket machines at barriers, and payment machines or kiosks at the entrance/exit of car parks can often cause problems for short people and those with hand or arm impairments, as well as for those with hearing difficulties if sound recordings are included in the device used.

13. It must be made clear whether Orange Badge holders are exempt from payment of parking charges.

14. *Parking meters:*

- should be low enough for everyone to reach, including wheelchair users; people with hand impairments should be able to insert money with ease – in other words, the meters should be positioned at a height of 900 mm–1200 mm from the ground, and accessible from the parking bay or footpath;
- should be brightly coloured to contrast with their surroundings, to help partially-sighted people;
- must not reduce the clear width of the accessible route to below the minimum requirement;
- should not cause an obstacle for pedestrians, especially those who are visually impaired.

15. *Machines:*

- must have instructions which are easy to read and understandable, with controls which are easy to operate;
- should be at a height of 900 mm–1200 mm from the ground, with clear space for access in front;
- should be provided close to the parking spaces allocated for disabled users (those who are not already exempt from payment – see paragraph 13 above).

Access route

16. The access route from the car park to the building or buildings which it serves must be level or at a gentle gradient, preferably covered, and unobstructed, with a minimum clear width of between 1800 mm and 2000 mm.

17. Directional signs should be posted at all pedestrian exits to the car park. Colour-coding, or textured surfaces, should be provided for principal routes and also to inform users of changes in direction where appropriate.

18. If the footpath is raised from the car park, a dropped kerb should be provided at regular intervals throughout the car park (see "dropped kerb" data sheet below).

19. Any wheelchair-accessible or "easy access" parking spaces should be located close to the main circulation route and car park entrance.

Signs

20. Directions to car parking areas should be signed from the main traffic routes; entrance and exit signs should be clearly visible from all parts of the car park.

21. At the entrance to the car park, the designated spaces for different categories of user must be clearly signed or marked. The international "access" symbol (in white on a blue background, 300 mm x 600 mm) should be used to denote spaces for wheelchair users. The signs for "accessible" spaces should be positioned both on the ground and at a height (1500 mm from ground) where they can be seen clearly, even when a car is parked in the space.

22. Signs should not be positioned where they may obstruct an "accessible route" or cause a hazard to visually-impaired pedestrians.

Ground surface

23. The surface of the parking bays should be level, hard, and of a non-slip type. Uneven, loose gravel or stony surfaces will make it difficult for people using sticks or crutches, and extremely difficult for wheelchairs and pushchairs/prams, to manoeuvre. Steep cross-falls on paths should be avoided, as they may throw a wheelchair user, or a person walking on crutches, out of control.

Lighting

24. For safety and security, the lighting in outdoor car parks should be a minimum of 20 lux.

25. The lighting in covered car parks should:

- be a minimum of 20 lux at floor level, 50 lux at ramps and corners, 100 lux at entrances and exits and 200 lux at kiosks and in ticket machine areas;
- be positioned to avoid glare to drivers and pedestrians;
- provide a transition zone, at entrances and exits, from the level of lighting inside the car park to the level of lighting outside, to accustom drivers' eyes to the change in level.

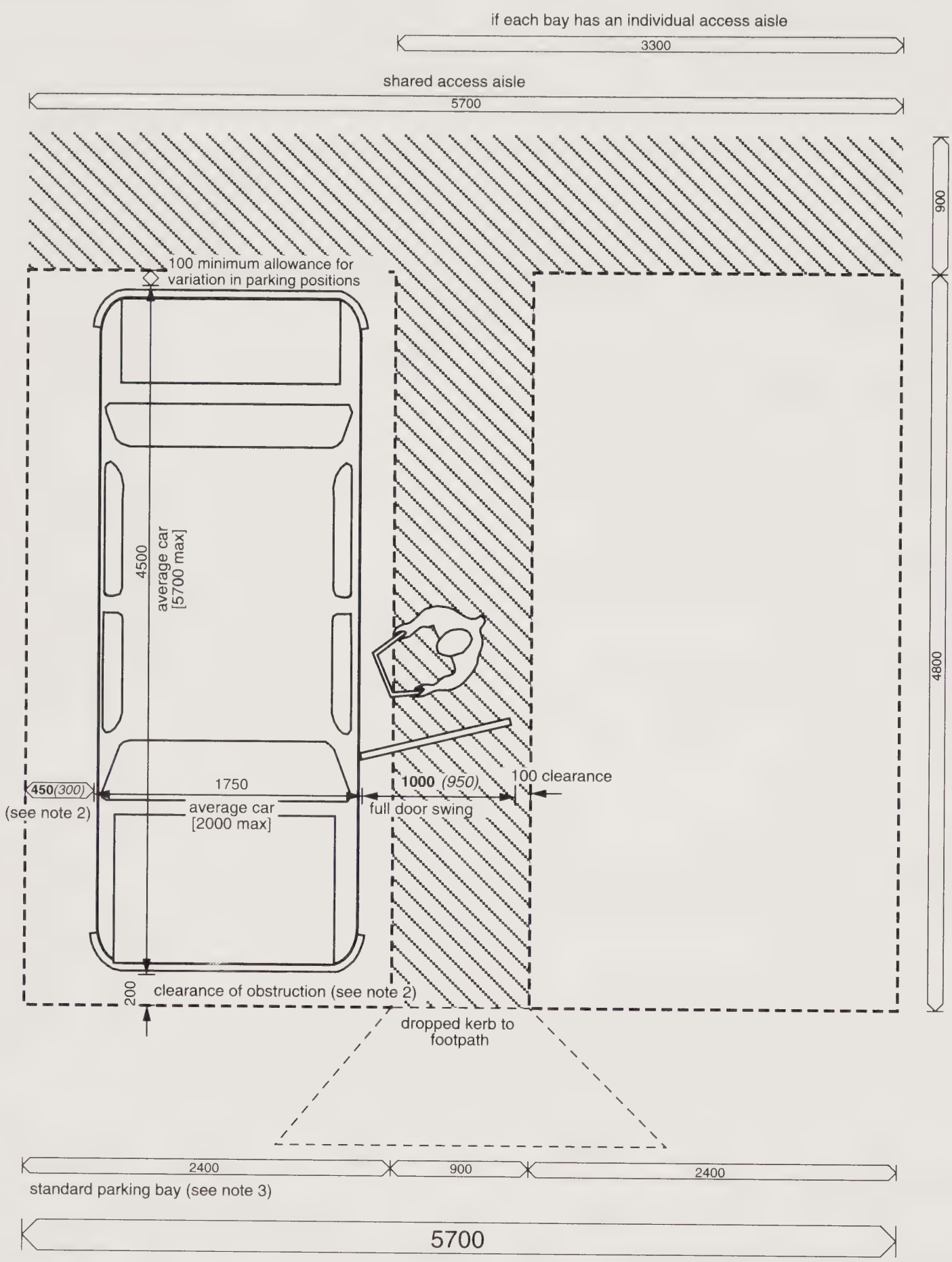
Activities:
Parking bays - getting into and out of car.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Car Parking 1

Easy Access

Users:
Semi ambulant and fully ambulant users.



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Average space length (in line parking) includes allowance for manoeuvring car into and out of parking space. Add 1000 to length and 200-300 to width for large (American type) car. An end bay against a wall or obstruction should be increased to 7000 (8000) overall to allow for safe manoeuvring.

2. 300 (pref. 450) allows restricted circulation space for fully ambulant users.

3. Standard parking bay width is an average for multi-bay situations. End bays against wall or other obstruction should be increased by 200 (100). Similarly 300-800 depending on level of convenience should be added to end bay for semi or non ambulant users.

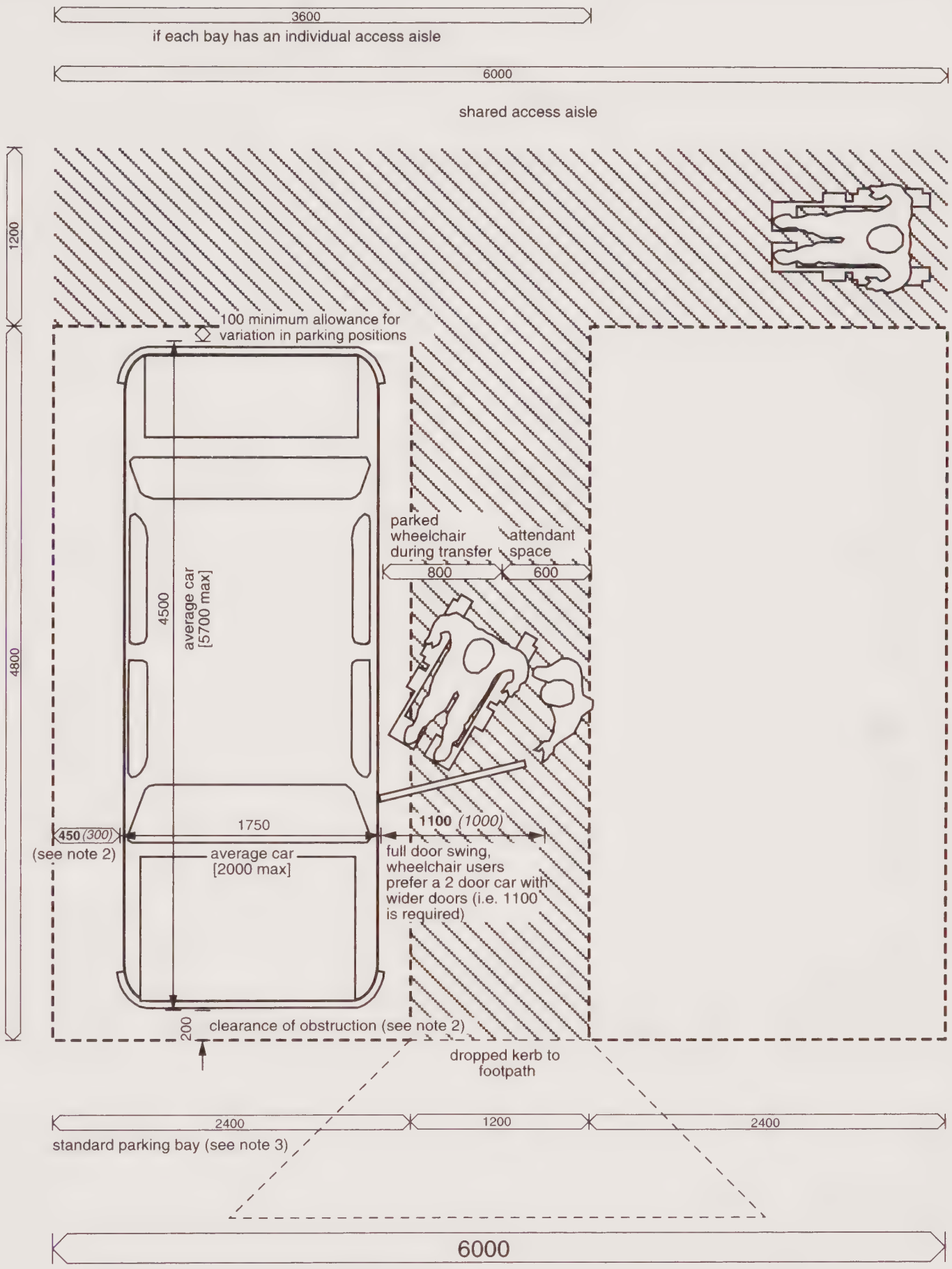
Activities:
Parking bays - getting into and out of car.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Car Parking 2

Wheelchair Access

Users:
Non ambulant, assisted and independent wheelchair users.



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Average space length (in line parking) includes allowance for manoeuvring car into and out of parking space. Add 1000 to length and 200-300 to width for large (American type) car. An end bay against a wall or obstruction should be increased to 7000 (8000) overall to allow for safe manoeuvring.

2. 300 (pref. 450) allows restricted circulation space for fully ambulant users.

3. Standard parking bay width is an average for multi-bay situations. End bays against wall or other obstruction should be increased by 200 (100). Similarly 300-800 depending on level of convenience should be added to end bay for semi or non ambulant users.

Dropped kerbs

(Notes to ergonomic data sheets)

General considerations

1. Reference should be made to Approved Document M of The Building Regulations, also the Department of Transport Mobility Unit's advice note DU/1/91 ('The use of Dropped Kerbs and Tactile Surfaces at Pedestrian Crossing Points').

2. The design of dropped kerbs must take into account the different – and conflicting – needs of visually-impaired people and wheelchair users. Dropped kerbs make it much easier for wheelchair users, and people with pushchairs, trolleys etc., to overcome abrupt changes in level which they would otherwise find difficult or impossible (for some wheelchair users, even a small jolt can cause acute pain).

3. Visually-impaired people, however, require some physical indication of the edge of a pavement; in order to avoid walking unaware on to the road, kerbs are used by them to indicate the presence of a road. If kerbs are removed to aid people with mobility difficulties, a substitute indicator of the road's presence must be provided – that is, if the pavement is level with the road, there should be a change in texture (distinguishable through the soles of shoes, and by the canes used by visually-impaired people) provided as a warning indicator; adequate drainage must also be provided.

Location

4. Dropped kerbs must:

- be provided at locations where people leave the pavement to cross the road, at which points there must be an unobstructed view of traffic approaching from any direction;
- always be directly opposite one another across a road. It is dangerous to have one on only one side of the road, as a person may be unable to mount the opposite kerb and then be stranded in the flow of traffic;
- be provided at any vertical rise greater than 13 mm.

5. Dropped kerbs should be avoided at places where doors occur. Doors should not have to be opened at the same time as negotiating a kerb ramp, as this is extremely difficult for wheelchair users and people with pushchairs – a wheelchair user, after mounting the kerb ramp, will be tilted backwards, and is therefore unlikely to be able to reach the door handle, whereas people with pushchairs will not be able to reach the handle without walking around the pushchair, and will then need to pull the pushchair through the door.

Gradient

6. The gradient of the dropped kerbs must allow people to negotiate them easily and quickly move out of the flow of traffic. Steep dropped kerbs may cause people to lose control of wheelchairs and pushchairs.

7. The gentler the slope, the more people will be able to use it with ease and safety. The pavement must be dished over the area of the dropped kerb, with no abrupt change of slope and a maximum gradient of 1:12.

8. Dropped kerbs with returned sides are only acceptable where they do not interfere with the main direction of pedestrian flow and where people are not required to walk across them.

Width

9. Dropped kerbs must be wide enough for double pushchairs and electric pavement vehicles to negotiate them. The flush width should normally be a minimum of 2000 mm. (In locations of high flow, the flush width should be 3000 mm.) The minimum width can be reduced to 1200 mm adjacent to areas of car parking reserved for disabled users.

Depth

10. At a 2000 mm-wide pavement, dropped kerbs should extend over the entire depth. Where the pavement is 3000 mm wide or greater, a level area 1000 mm wide can be provided behind the dropped kerb.

Surface

11. The dropped kerb should have a tactile, modified blister surface covering the dropped kerb area in accordance with DU1/91,'The Use of Dropped Kerbs and Tactile Surfaces at Pedestrian Crossing Points', to indicate its existence. Textured surfaces help ambulant disabled people to keep a firm grip, as well as indicating to visually-impaired people the change in level.

12. The bottom of a dropped kerb should be rounded, or otherwise distinguishable – for example, by a tactile strip – to help visually-impaired people locate them. A continuous yellow line should be painted along the edge of the road closest to the kerb.

13. The following types of dropped kerb should be avoided: those with non-parallel sides; with a camber; onto roads with a steep camber or concave gutter; projecting into the gutter; sited near drains; or those located close to loose surfaces such as gravel or earth (as these may get onto the ramp and affect the surface performance).

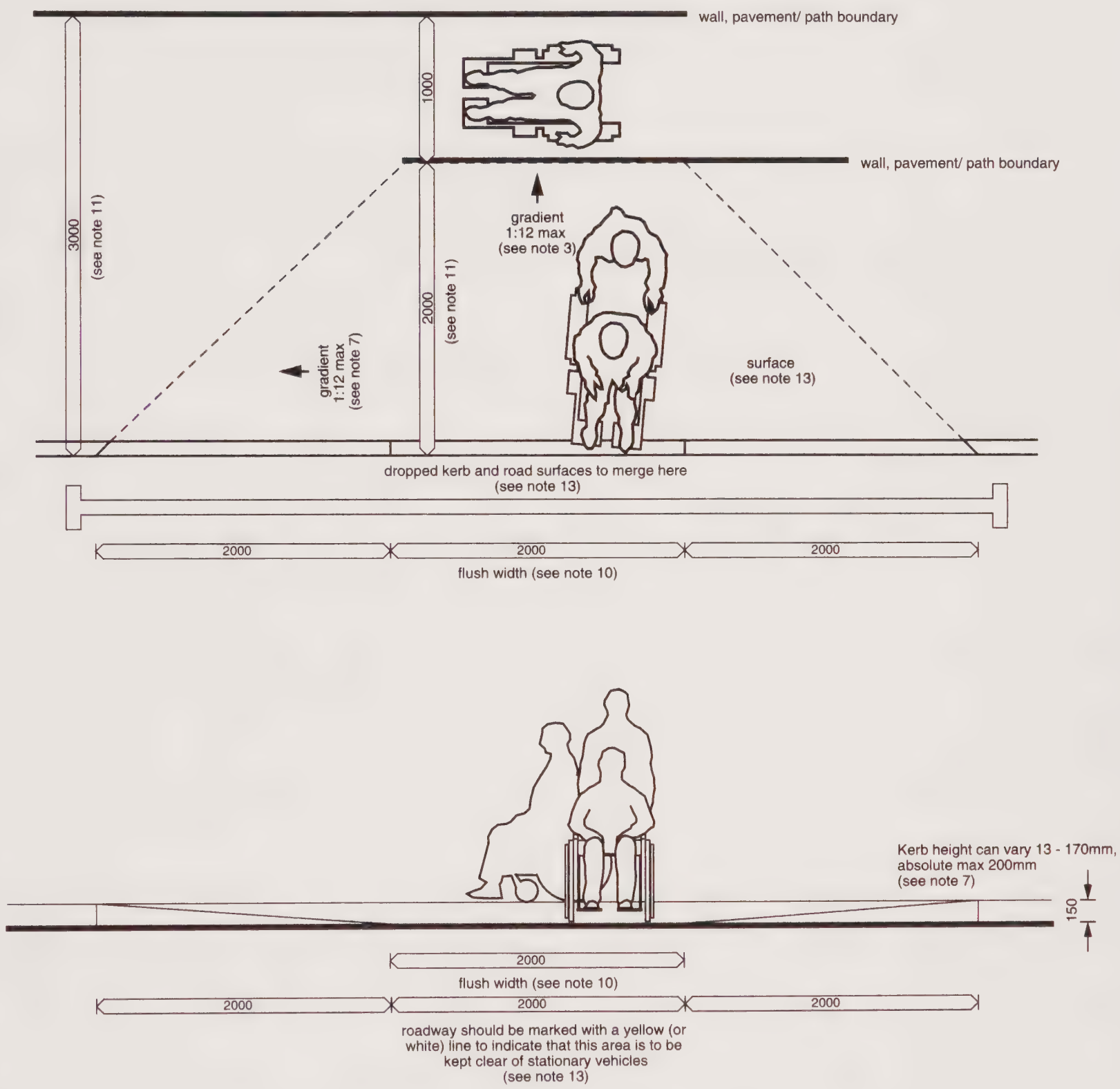
14. Where gratings are installed for the purpose of conducting rain water away, these should be located upstream of the kerb ramp, in order to prevent flooding at the bottom of the ramp. Where gratings occur in front of kerb ramps, the holes should be small to prevent wheelchair castors and walking aids becoming stuck; to achieve this,the slots should not be more than 12 mm wide, with metal at least 13 mm thick, and aligned at 90° to the direction of travel. All grating surfaces should be set level with the roadway; it is best that gratings are not located at crossings.

Activities:
Moving from pavement to roadway or vice versa by wheelchair users and mobile equipment

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Dropped Kerb

Users:
Non ambulant, assisted and independent wheelchair and fully ambulant users.



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes on opposite page

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Ramps

(Notes to ergonomic data sheets)

General considerations

1. Reference should be made to Approved Document M of The Building Regulations for specific legislative requirements.

2. Ramps enable people with wheelchairs and pushchairs to move easily between one level and another, and should be provided where any changes in level occur. However, for ambulant disabled people, a ramp is not as convenient, easy or safe to use as steps, and therefore a ramp should always be accompanied by steps.

Gradient

3. Ramps must be of a gradual gradient, in order that wheelchair users can negotiate them independently (most can manage a slope of 1:15 or 1:20). The following gradients are recommended:

- 1:10 for short ramps less than 3000 mm (steeper gradients are more practical for very short distances);
- 1:12 for distances up to 5000 mm (and for distances up to 5000 mm between landings);
- 1:15 for distances up to 10000 mm (and for distances up to 10000 mm between landings).

Width

4. The preferred width for a ramp is 1500 mm (a minimum width of 1200 mm, with an unobstructed width of 1000 mm). A width of 1800 mm will allow two wheelchair users to pass. (Reference should be made to the 'person' and 'wheelchair' ergonomic data sheets in this Volume for further information on space requirements for users and their assistants.)

Length

5. The length of a ramp is dependant on the gradient and the change in height to be overcome, but should never exceed 24000 mm, and in any case should not exceed 10000 mm without a rest landing.

Approach space and landings

6. Level approach spaces (clear of any door swing or obstruction) should be provided at the top and bottom of any ramp. Areas measuring 1500 mm x 1500 mm are preferred (minimum 1200 mm x 1200 mm), and any intermediate landings should be not less than 1500mm in length.

7. Landings should be provided at any changes in direction of the ramp which are greater than 10°, and at intervals of 10000 mm where appropriate.

8. Tactile cues should be provided, including foot-detectable changes in surface 450 mm long across the landing at both ends of the ramp. Such changes could simply be from a carpeted surface to a vinyl surface; corduroy or blister tactile surfaces should not be used in this instance.

Handrails

9. It is important that ramps have handrails, which give vital support, confidence and security to all users by providing lateral body support and hand support as well as providing tactile cues for visually-impaired people. Handrails may also provide support for independent wheelchair users when resting on the ramp.

10. Handrails are required on both sides of a ramp to assist people with disabilities on their right or left, as well as those carrying bags in one hand. Handrails should be provided on any ramp with a rise greater than 150 mm.

11. It is recommended that handrails are provided at two heights – a standard one 900 mm above the ramp surface, and a lower one 610 mm above the ramp surface for children and wheelchair users.

12. Handrails must be continuous around dog-legs or switchbacks and over landings; where this is not possible, they should extend horizontally a minimum of 300 mm beyond each end of the ramp before being returned to the wall, floor or post, in order to allow users to regain their balance on the level area.

13. These extensions also indicate the presence of a ramp for visually-impaired users, but they should not project out into the path of other pedestrians.

14. Further detailed guidance is given in the Notes to the 'handrails' ergonomic data sheets later in this volume.

Edge protection

15. The open side of a ramp or landing should have a raised kerb in order to prevent feet and wheels slipping off. The kerb or barrier should be painted in a contrasting colour to the ramp and its surroundings.

Surface/appearance

16. There should be contrasts of colour and tone between the ramp and adjacent areas, such as handrails and background colour. If coloured markings are to be provided on the ramp itself, however, they should form a 'V' configuration pointing in the change of direction, rather than a line at top and bottom which could create confusion with stairs.

17. Ramps should have a permanent, regular, non-slip surface. Indoor ramps should not be covered in deep- or shag-pile carpet, as this is difficult to traverse in a wheelchair. External ramps should not be covered with glazed or polished masonry or cobblestones.

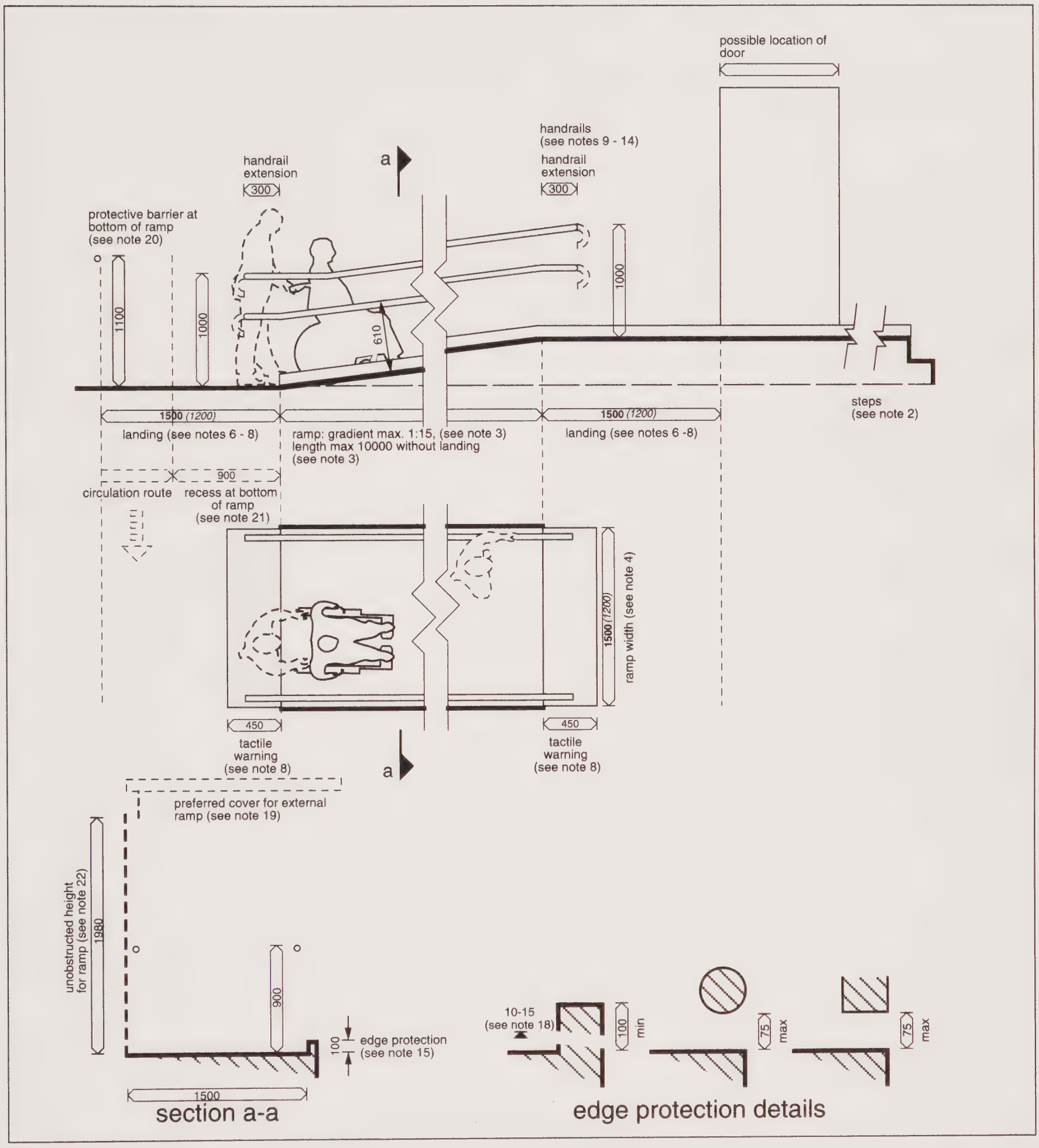
Activities:
Use of ramped access for ambulant, semi ambulant, independent and/or assisted wheelchair use, pushchairs etc.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Ramp

General

Users:
Ambulant, ambulant with pushchairs etc, semi and non ambulant.



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes on opposite page

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18. Outdoor ramps should not allow the accumulation of water on their surface; for this reason, a camber of 1:100 (max. 1:50) is permissible, which should not affect the steering of wheeled conveyances or other items. There should be gaps of 10–15 mm left at intervals in the edging, above the level of the ramp, to enable rainwater and grit to drain off.

19. Ramps can be dangerous in wet or icy weather. Where possible, outdoor ramps should have a canopy above, to protect them from rain and snow.

Obstructions

20. Where a ramp leads down to a road or any place where there may be traffic, a barrier in the form of a railing to a height of 1100 mm across the full width of the ramp should be installed at the bottom of the ramp, in order to prevent users walking or rolling into the road; such a barrier should be no more than 1500 mm from the base of the ramp.

21. Where a ramp intersects with a pedestrian route, there should be a level area of 900 mm length, in order to allow wheelchair users and people with pushchairs to turn round and join the flow of pedestrians.

22. The ramp should be clear of obstructions for the width of the ramp and to a minimum height of 1980 mm (excluding handrails).

Lighting

23. External ramps and walkways should have a minimum lighting level of 75 lux at the pavement. This should be increased to 150 lux where the building is designed specifically for visually-impaired people.

External steps

(Notes to ergonomic data sheets)

General considerations

1. Reference should be made to Approved Document M of the Building Regulations for specific legislative requirements.

2. If a level approach to the building's entrance cannot be achieved, then steps and a ramp must be provided. Steps are preferred to ramps by many people, and, when correctly detailed, steps provide independent access for many ambulant disabled people – for example, those with arthritis or those who use crutches. However, steps are a barrier to people in wheelchairs or with pushchairs/prams etc., so a ramp should be provided wherever there are steps (see notes to data sheet 'ramps' above).

Approach and landings

3. People with impaired sight are at risk of tripping or losing their balance when meeting sudden changes in level; this risk is at its greatest when approaching the head of a flight of steps. The existence of steps, on their own or within a flight, should be made apparent; stairs should be designed so that they are not a continuation of the line of normal pedestrian travel.

4. The clear, unobstructed length of landings should be 1500 mm (1200 mm as a minimum). The top and bottom steps of a flight should not encroach onto the landing area.

5. Steps should not interfere with circulation spaces; they should be recessed from the circulation route by at least 600 mm at the top and 750 mm at the bottom, to avoid pedestrian collisions and to allow handrails to level out.

Height

6. Although many ambulant disabled people find it easier to climb steps than to use ramps, it is still important that any flights of steps are not too long and are broken up by landings. The maximum permitted height for the rise of a flight of external steps between landings is 1200 mm, and it is recommended that there is a minimum of three and a maximum of nine steps.

7. Generally, the flatter the pitch (angle), the safer steps will be. The recommended pitch for public steps is 27° (with a maximum of 38°).

Risers and goings

8. Risers and goings should be uniform throughout the flight, as any irregularities can cause people to stumble.

Nosings

9. Nosings should be marked in a colour/tone that contrasts with the colour of the stairs, extending the full width of the step and reaching a depth of 50–60 mm on both tread and riser. Any edges should be firmly fixed and be of a non-slip type. Sharp nosings and abrupt angles should be avoided.

Edge protection

10. It is necessary to prevent feet, crutches and sticks from accidentally slipping off the edge of open-plan steps. For steps not adjacent to walls, a barrier, with a maximum height of 100 mm above the level of the treads, should be provided.

Step surface and type

11. The surface of the steps must be (and also appear to be) non-slip, and to aid visually-impaired people the risers should be a contrasting colour to the treads. A fall of 1:100 is recommended, to prevent water from accumulating on the steps and to maintain a non-slip surface in wet conditions.

12. A change in surface texture at the top and bottom of each flight of steps is needed, to act as a warning for visually-impaired people that there is a change in level ahead. This surface should be of a corduroy texture.

Width of steps

13. Distractions should be avoided, especially at the top of steps where people may lose their concentration as well as their footing.

14. In addition, the use of open risers is not recommended, since they are especially dangerous for the ambulant disabled – such as those users with braces and prostheses – who need a solid riser to guide their feet onto the next tread. Open risers allow feet to catch on the underside of the tread, and are therefore also hazardous to those using sticks and canes.

15. Single steps, and any changes in level of less than 100 mm, are to be avoided, as are spiral and helical steps.

16. The steps must be wide enough for people to negotiate comfortably by holding onto either one or both handrails or by being assisted. The width of the steps should reflect the amount of pedestrian traffic (reference should be made to the 'person' ergonomic data sheets in this volume for further information on space requirements for users and their assistants).

17. A minimum clear step width of 1000 mm for one person, or 1500 mm for two-way traffic, is necessary. A middle handrail should be provided on any flights of steps wider than 1800 mm.

Activities:
Walking up and down steps.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

External Steps

Users:
Ambulant and semi-ambulant people, including children, with or without assistance.

handrail extension (300)
handrails (see note 15 - 17)
handrail extension (300)
2000
610
edge protection (see note 11)
max 1200 (see note 7)
recess at bottom of steps (see note 6)
750
circulation
landing (see note 3 - 5)
1500 (1200)
2000 (1500)
150
800
400
min
max
tactile warning (see note 5)
recess at top of steps (see note 6)
650
circulation
landing (see notes 3 - 5)
1500 (1200)
clear distance between handrails to be maintained on landings
1500 (1000)
1500 (2000)
1700 (1200)
(see notes 13 + 14)
150
400
800
max
min
tactile warning (see note 5)

nosings see note 9

300 (280) 350 max
130 (100) 150max
60°

Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes on opposite page

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Handrails

18. Reference should be made to the 'handrail' data sheet later in this volume for further guidance.

19. Handrails are required by some users to help them to pull up steps; they are also used for balance and support when descending. Handrail extensions also provide tactile cues to the presence of changes in level for visually-impaired people.

20. Handrails:

- must continue for a minimum of 300 mm horizontally from the top step; where the handrail does not interrupt pedestrian routes, an extension of 450 mm from the top step is recommended. Central handrails may project into the landing by the same amount as the going, and for external steps leading to an entrance door the central handrail should continue across the landing to the door;
- must be located within the width of the tread; and
- should be provided on both sides of the steps, to assist people with left or right disabilities, those using a walking stick, or those carrying a bag in one hand.

Balustrades

21. Balustrades should be provided around landings to a height of 1100 mm, to prevent people falling. They should not allow young children to fall between the gaps (which should be no wider than 100 mm), nor provide toeholds for climbing up.

Lighting

22. Steps and landings should be well illuminated, either naturally or by artificial means. The lighting should be designed so that it highlights the differences between risers and treads, the top and bottom steps, and any changes in direction.

6.4 Doors and lobbies

Doors

(Notes to ergonomic data sheets)

General

1. Guidance on the use of doors and doorsets in health buildings is contained in HTM 58 'Internal doorsets'.

2. Doors in health buildings will be used frequently by people in pain or with reduced strength, those with reduced hand function or reduced mobility, or those in wheelchairs. People may also be carrying children, overnight bags or hospital equipment, or manoeuvring other equipment such as trolleys, or pushing pushchairs or wheelchairs – all of which make it difficult to push or pull doors open.

3. Bomber hinges should never be used, as these can cause doors to swing back and injure an unsuspecting visually-impaired person or a person with mobility difficulties.

Approach

4. Reference should be made to the 'Lobby' and 'Corridor' data sheets elsewhere in this volume.

5. A level area is required in front of doors to allow people to stand or park a wheelchair or pushchair whilst manoeuvring the door. The surface of the floor or ground must be non-slip.

6. It is advisable that doors open away from areas with a high pedestrian traffic flow, towards areas with a lower pedestrian traffic flow. There must be sufficient space to one side or both sides of a door to allow for people to pass or wait for others coming through in the opposite direction. Where there is high usage it will be necessary to provide a waiting space on both sides of the door.

7. Doors at the corners of rooms should be hung with the hinges nearest to the corner so that the door rests alongside the wall when open. This allows the maximum access space at the side for people with wheelchairs or pushchairs, or people with other mobility difficulties, to manoeuvre effectively and pass through the door. A minimum of 300 mm must be provided on the handle side of the door, to allow space for approaching and opening the door.

8. Doors should not open outwards into restricted passageways (for example, corridors and smaller circulation areas), except in instances such as rooms with (necessarily) more restricted dimensions (toilets, walk-in cupboards, etc.). The use of outward-opening doors for toilets is important, in that assistance can be given in the event that the occupant falls against the door.

Thresholds

9. A step and thresholds must be avoided wherever possible, or, where this is unavoidable, kept to a minimum. It is impossible for wheelchair users, or people with pushchairs and trolleys, to negotiate a door and a threshold at the same time. (See also 'Dropped kerbs' data sheet earlier in this volume.)

10. It is possible to use recessed drainage channels or other alternatives to divert water away from doors, and to use draught excluders instead of thresholds. Where a threshold is unavoidable, its maximum height should be between 10 mm and 13 mm; rubber thresholds are the most easily traversed by wheelchairs and pushchairs.

Door width

11. A minimum width of 900 mm for a single-leaf doorset is recommended. In areas of heavy use, a minimum width of 1000 mm is preferred, in order to to allow the free passage of wheelchairs and double pushchairs.

12. Table 1 on the data sheet 'Doors 1' gives the recommended effective limits for door width.

13. For double-leaf doors, both leaves should either open in the same direction or swing both ways. The recommended width of a double doorset is 1800 mm, comprising two 900 mm-wide doors. Alternatively, the minimum width is 1550 mm, divided asymmetrically with the smaller of the two doors a minimum of 750 mm. To avoid confusion, wherever an asymmetrical door arrangement occurs, this provision should be consistent throughout the building.

Force to open door

14. The force required to push or pull doors should generally be kept to a minimum, to allow everyone – including children, elderly and frail people – to open them easily. Fire doors, however, should be capable of being opened by exerting the minimum force as stipulated in BS5588.

Door closers

15. Door closers or rising-butt hinges should be fitted to every door, to prevent doors being left half-open, which would render visually-impaired people at risk of injury. Rising-butt hinges and horizontal-bar handles can be used as alternatives to automatic closers on those doors which are required to be kept shut.

16. Automatic closers must allow sufficient time for people to pass through the door (the door should remain fully open wide for at least 6–7 seconds). As the door closes it is recommended that there is a 3-second minimum delay for the door to move from 90° to 12°, to prevent injury to any persons standing close by. Automatic closers must have

a check mechanism, to prevent them swinging beyond the closed position. Doors fitted with closers should provide a maximum resistance of 35 N (external doors) or 25 N (internal doors).

17. Fire doors fitted with automatic closers are heavy and awkward to open, thus forming a major barrier to easy circulation for many people. It is recommended that fire doors on circulation routes be fitted with electromagnetic stays, which in the event of a fire will break the circuit and cause the doors to close. On doors which are designed to remain open, the edges should be recessed when open in order to avoid creating an obstruction; alternatively, the edges could be highlighted to make them more obvious and noticeable.

18. Strong floor spring closers (often fitted to external heavy doors) should be avoided, unless used in conjunction with automatic opening and closing devices.

Door handles

19. Door handles should be easy to use by people with weak hands and arms, also people using walking frames or crutches or carrying objects, etc. Door handles should allow a firm grip for the hand, and be fixed at the correct height and positioned at a consistent height on all doors throughout a building. Consistent positioning allows people – particularly those who are visually-impaired – to anticipate the handle position and thus find the handle more easily.

20. The colour of door handles should be contrasted to that of the door, so that the handles are easily identifed by visually-impaired people.

Pull handles

21. Knobs and round pull-handles should be avoided, since people with impaired hand function find these difficult (if not impossible) to use.

22. Vertical pull-handles enable people of different heights, or those sitting in wheelchairs, to grasp them at a height which gives them the best mechanical advantage, enabling doors to be opened more easily. To facilitate this, the pull-handles should have a minimum length of 300 mm.

23. Handles used for pushing or pulling should be fitted on both faces of the door. Doors should be clearly marked with a sign adjacent to the handle to indicate whether the handle should be pulled or pushed. Handles should be D-shaped, to reduce the risk of catching clothing or causing injury.

24. Horizontal-bar handles across the width of the door can be fitted in addition to vertical handles for ease of opening and closing. Horizontal bars provide support to people with mobility difficulties who may be unsteady; the bars help them to keep their balance as they pass through the door. It is desirable that any doors which are not fitted with automatic closers should be fitted, along the full width of the closing side of the doors, with horizontal pull-bars, mounted at a maximum height of 1000 mm.

25. It must be noted, however, that horizontal bars reduce the clear opening width of the door, and this must be considered when selecting the doorset.

Handles for latching doors

26. Door handles which unlatch must be easy to grasp and open with one hand and not require tight grasping, pinch grips, extensive twisting of the wrist, or fine finger-control to operate them. Lever handles are recommended, because they can be operated using elbows if a person suffers from impaired hand function. Handle design should minimise the risk of catching clothing or causing injury – for example, by curving the end of the lever towards the door.

27. Minimal force should be required to operate the door handle.

Sliding doors

28. Sliding doors are economical in space, and automatic sliding doors are easiest to use by everyone. Manually-operated sliding doors should be avoided, since they are difficult to operate by most people – indeed, often impossible for elderly people and those with mobility difficulties or impaired hand function. Where manually-operated sliding doors are unavoidable, the door handles should be mounted vertically, easy to grip and not recessed.

29. Sliding doors should:

- be clearly marked as such, to avoid confusion with conventional push/pull side-hung doors;
- be well-maintained, to ensure that the tracks allow smooth movement;
- incorporate a safety device (that is, a guard), either along the length of the sliding sections or between the doors and walls.

30. Heavy sliding doors may be fitted with a cord and geared pulley mechanism to ease the opening and closing procedure. Other possible solutions are a counterweight to close the door or an inclined track to carry the door; however, both of these solutions would increase the difficulty of opening the door.

Automatic doors

31. The provision of automatic doors is generally recommended, as automatic doors require no effort by the user; this type of door arrangement is especially desirable in areas of high use (that is, the main entrance to a health building).

32. Automatic double sliding doors should have a 1200 mm clear width, with a 1200 mm clear approach space in front of and behind them.

33. Automatic doors can be triggered by a photo-electric light barrier, pressure pads or selector switches. The sensors operating automatic doors must acknowledge children, wheelchair users and guide dogs as well as taller people, and the sensor should not allow the door to close if the doorway is not clear. If floor sensors are used they should be sensitive to uneven pressure – for example, that exerted by people using crutches. Push buttons to activate automatic doors should be sited out of the door swing, at a height of 1000 mm and should measure approximately 50 mm by 50 mm.

34. Automatic sliding doors are preferable to automatic swing doors, as the latter could cause injury if other people near to the door have insufficient time to move out of the way.

35. Automatic doors which swing towards the user are potentially dangerous, and should only be used when they form part of one-way routes where they can swing away from users. Where doors unavoidably swing into the direction of travel, there should be guard-rails erected at right angles to the wall housing the door, which are at a height detectable by the canes used by visually-impaired people. Where the floor surface allows, it is desirable that the area which each door swings through should be marked on the floor by contrasting coloured lines or hatching. In addition to the swing space, for swing doors, there must be at least 1400 mm of clear space in front of the door, which should be clearly marked on the floor.

36. The use of revolving doors should be avoided, as they are very difficult (if not impossible) to negotiate for those pushing pushchairs or using wheelchairs. Similarly, doors that swing towards each other into the intervening space are not recommended.

Glazing

37. All door glazing should be easily identifiable as such, and frameless glass doors should be easily recognisable in order to prevent people colliding with them, and also to aid visually-impaired users – that is, by the use of smoked glass together with coloured signs at eye level, or coloured, full-width horizontal door handles.

38. Doors which swing in both directions, and also one-way doors in corridors etc., should contain a glazed portion to allow people to see others approaching from the opposite direction.

Kick plates

39. Doors should be fitted with kick plates, which should be mounted to a minimum height of 400 mm on the push side of doors to protect them from damage from pushchairs and wheelchairs.

Contrast

40. Door frames should be a contrasting colour to the walls or surroundings, and door handles should be a contrasting colour to the door itself, to enable visually-impaired users to locate them easily.

Information

41. All name, number and information plates on or adjacent to doors must be at a height of between 800 mm and 1500 mm above floor level, so that they are easily readable (either by sight or touch). (For specific guidance, see the notes to the 'Signposting' data sheets elsewhere in this volume.)

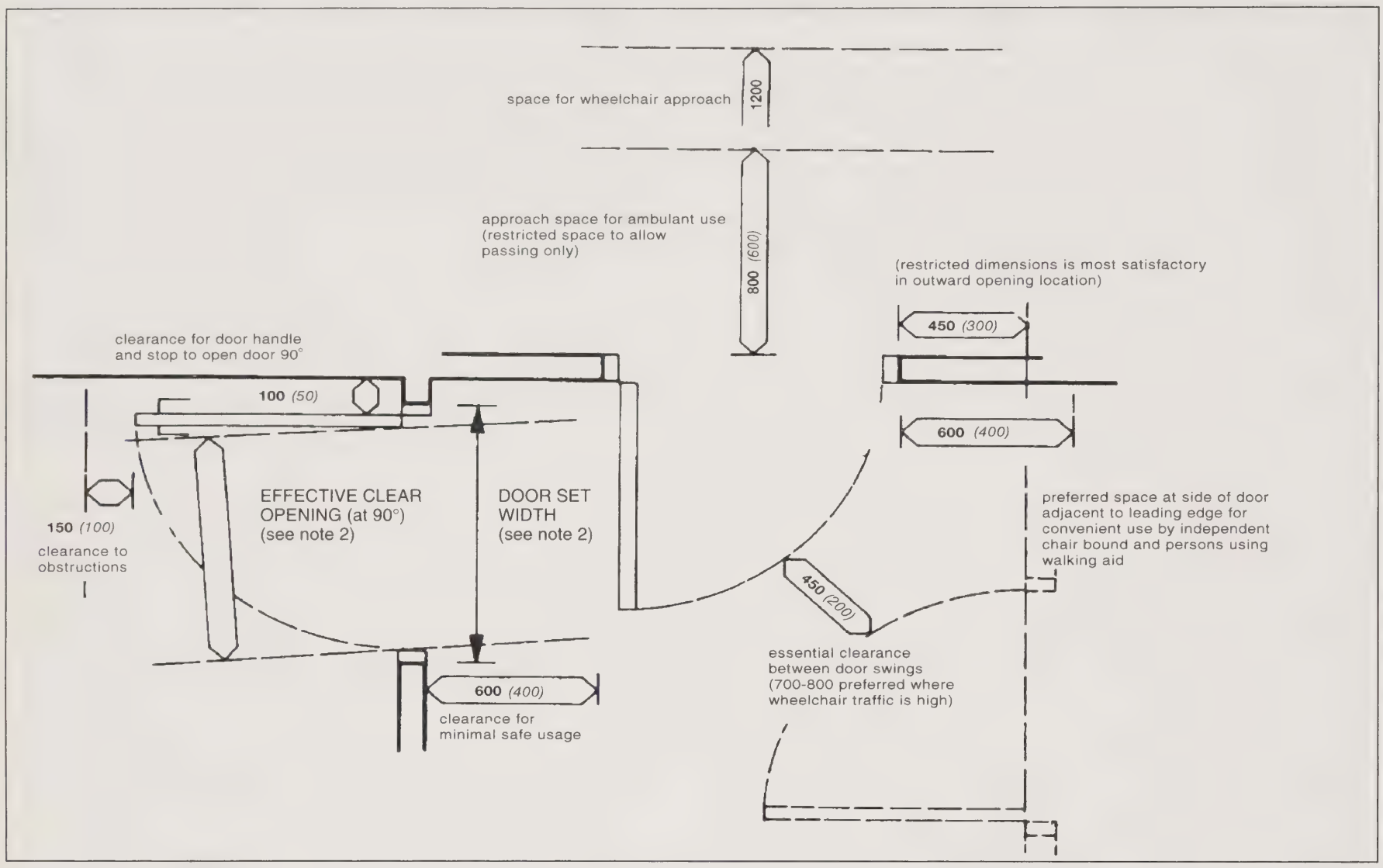
Activities:
Movements through single doors, including location and minimum clearance for sole use by ambulant personnel, also some wheelchair traffic.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Doors 1

Single leaf, flush
900, 1000 1200, doorsets

Users:
Semi and non ambulant (wheelchair) users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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a. Door width limits for certain categories of movement are given in the following table. Movement may be impeded by inadequate space to turn into or out of door opening, lobby requirements should therefore also be checked by reference to the 'Lobbies' data sheets.

The table shows clear opening widths and suitability for various categories of movement. Taller items of equipment (i.e. over 900mm high or items carried at door handle height, will be afforded reduced clear opening width where the door swing is restricted to 90°. The figures in brackets show reduced widths for difficult lobby conditions.

Door Set Width	**900**	**1000**	**1200**
Approx. effective clear opening	**740**	**840**	**1040**
(reduced opening)	*(690)*	*(780)*	*(980)*
Type of movement possible			
Ambulant circulation only	√	√	√
Visually Impaired Person using long cane	√	√	√
Visually Impaired Person + Sighted Guide	(√)*D	(√)*D	(√)*D
Visually Impaired Person + Guide Dog	(√)*E	(√)*E	(√)*E
Carrying small tray/parcel	√	√	√*C
Semi-ambulant, using walking aid	(√)	√	√
Independent wheelchair		√ *B	√ *C
Assisted wheelchair		√	
Small trolley	√ *B	√	√
Medium trolley	(√) *A	√ *B	√
Large trolley			(√)
Patient trolley			(√)
Patient hoist (wide base)			(√)
Patient hoist (narrow base)		(√)	√
Hospital bed (Kings Fund)			(√) *A
Bed with attachments			*A

√ movement is satisfactory
(√) restricted movement only is possible
* refer to note below

A Movement is extremely restricted and use cannot be recommended for normal working conditions. Any attachments must be removed before even restricted movement is possible. Damage to door frames and equipment is likely to occur even when reasonable care is exercised.
B Some limitations on speed of movement may be experienced.
C Some difficulty in opening and closing heavier doors may be experienced.
D The minimum clear door width which allows a visually impaired person and sighted guide is 1200mm double leaf door.
E The minimum clear door width which allows a visually impaired person and guide dog is 1100mm double leaf door.

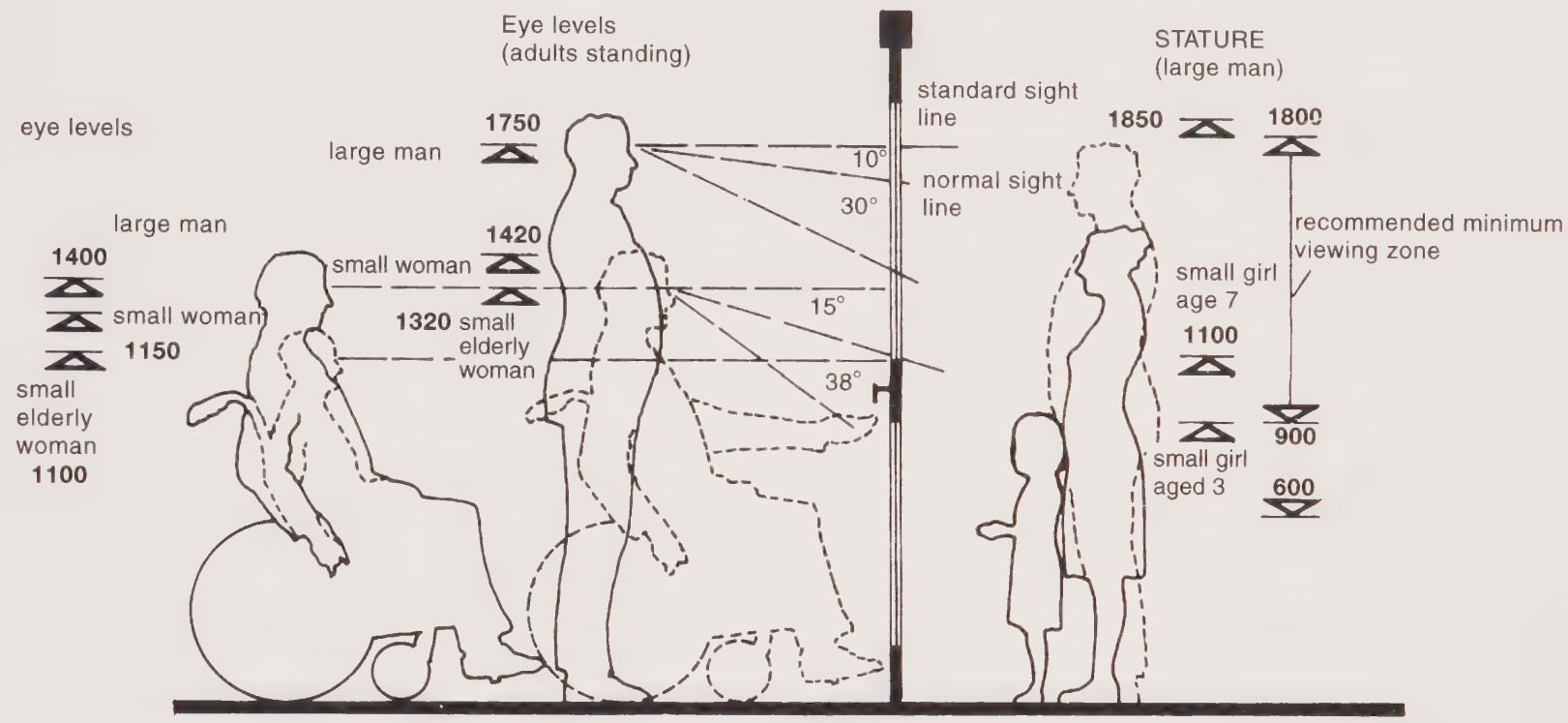
Activities:
Door handles and provision of vision panels.

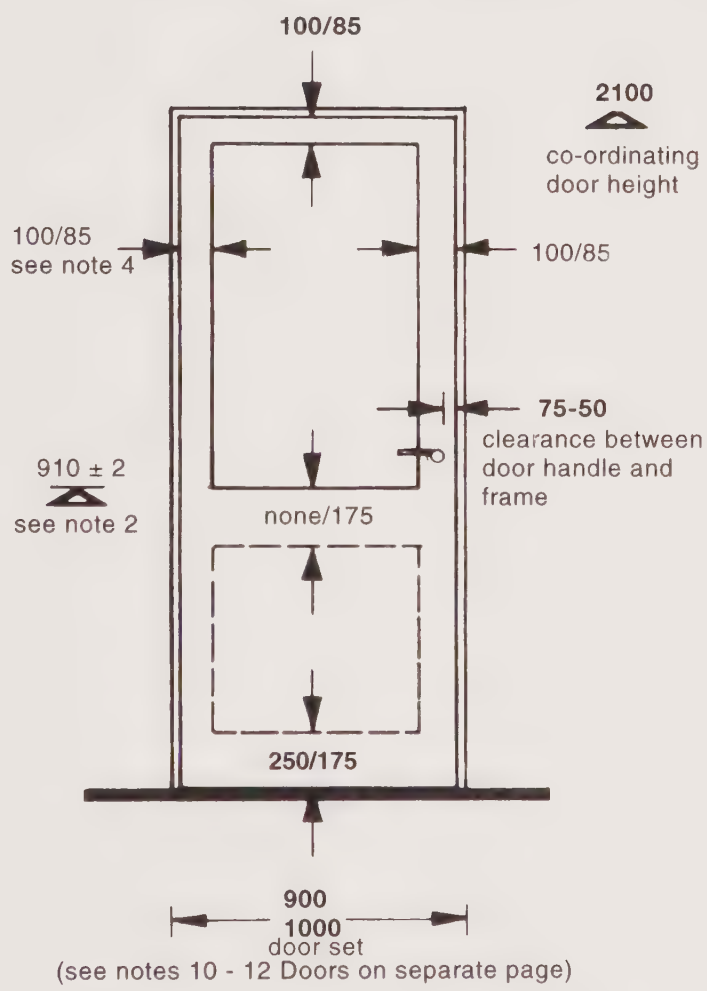
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

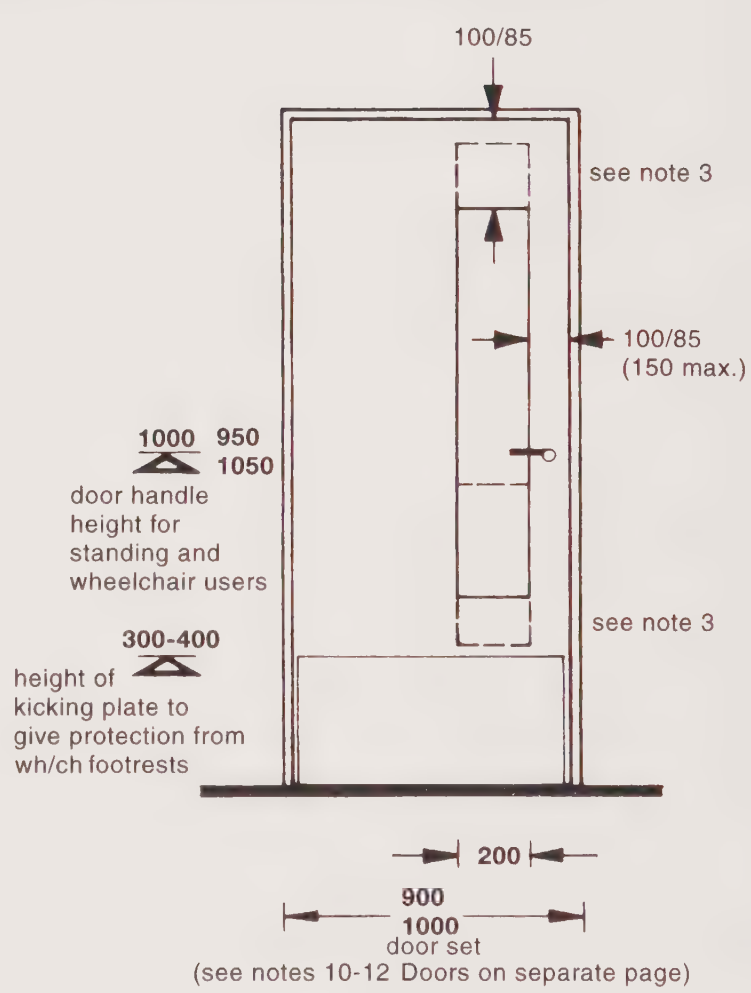
Doors 2

Door Handles and Vision panels

Users:
Semi-ambulant and non ambulant (wheelchair) users







Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. The physical dimensions of door shown on this data sheet are the minimum requirements in accordance with BS 4787: Part 1: 1980, Internal and external wood door sets, door leaves and frames. Part 1 Specification for dimensional requirements.

2. This is a BS co-ordinating requirement which ensures that the mid-rail of the door aligns with the cill of a standard 1200 high window, having a lintel common with that of the door frame.

3. The minimum glazed areas shown may be exceeded in any direction i.e. there is functional maximum glazed areas.

4. Door member sizes BS 4787 does not recommend standard sizes for glazed openings, but specified minimum sizes of timber members for each door.

Activities:
Opening and closing doors using level, or pull or push handles. (see HTM 59)

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

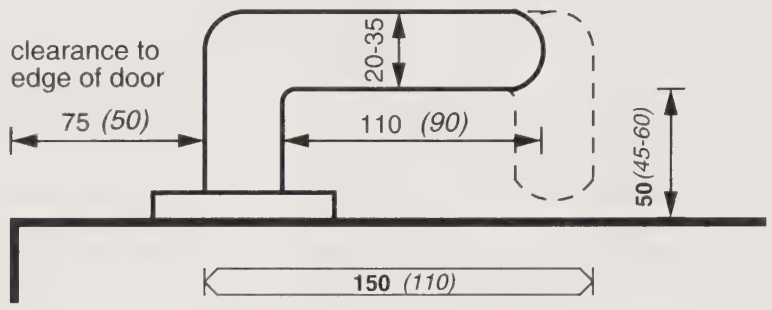
Doors 3

Ironmongery

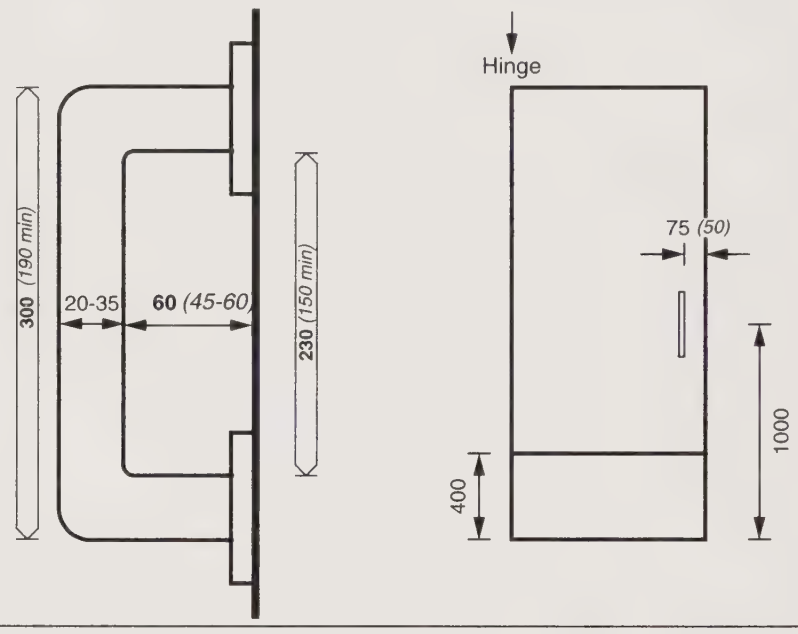
Users:
Wheelchair ambulant and semi-ambulant users

Latched doors.
If doors are latched, it is preferable to have lever handles: (door knobs are not recommended for use by elderly or disabled users.)

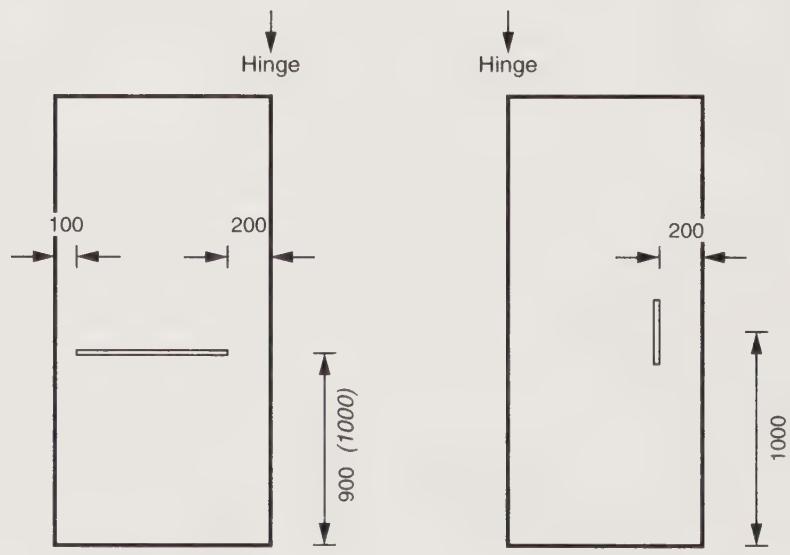
The finish should preferably not be highly polished and the design should avoid sharp edges.



Roller catches
Roller catches are more suitable for wheelchair and semi ambulant users provided they are light and easy to operate. However, if the spring attachment is too strong the action is potentially hazardous for the semi-ambulant and potentially inoperable by wheelchair users. Pull / push handles should be provided on both sides of the door along with a deep kick plate.



Self closing doors
Self closing doors should be provided where there is frequent usage by wheelchair or semi ambulant users.



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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Lobbies

(Notes to ergonomic data sheets)

General considerations

1. Reference should be made to Approved Document M of the Building Regulations for specific legislative requirements.

2. Lobbies are generally provided at entrances to departments, and should also be provided in situations where a toilet opens off a corridor.

3. In reception areas the doors should be visible from the reception desk, to enable assistance to be given to anyone having difficulty in negotiating the entrance. The doors can be parallel to each other, or at right angles.

Approach

4. The two sets of doors should preferably swing in the same direction or in both directions. Doors can swing towards each other in wider lobbies, or where the doors are offset. For automatic doors, both inside and outside the building, the zones for the open doors should be guarded to afford protection for the users.

5. For further information, see the 'Doors' and 'Corridors' data sheets elsewhere in this volume.

Length

6. There must be sufficient space for a person with a pushchair, trolley or wheelchair, and someone passing in the opposite direction, to pass through and close one door before opening the next. For automatic doors, the lobby length should allow for one set of doors to close before the other set opens when a person passes through at normal walking speed. However, the mechanism should not be set so that the second set will not open until the first has closed, since in an emergency, where speed of passage is important, such an arrangement could cause a delay and give rise to accidents.

Lobby width

7. The purpose for which the space is used may influence the size of the lobby doors or the decision to provide double rather than single sets of doors. Most wheelchairs can pass through a 900 mm doorset, but double pushchairs require a 1000 mm doorset. Wider doors are preferable to double doors, since it is difficult to hold open two doors at the same time as pushing a pushchair or propelling a wheelchair.

8. The lobby must be wide enough to allow the passage of double pushchairs, people using crutches and other walking aids, and also guide dogs, wheelchairs and trolleys or equipment if required.

Space at side of doors

9. For single-leaf doors there should be a space provided at the latch side of each door to allow people access to the door handle and to allow them to pass in opposite directions. The recommended space is:

- 600 mm (450 mm) to the latch side of the door, when the door opens towards a person;
- 450 mm (300 mm) to the latch side of the door, when it swings away from the person;
- 600 mm on both sides of the door, where doors swing in both directions.

Surface

10. Lobby surfaces should be level, and there should be no thresholds.

11. Mats should be of firm tread, to offer resistance to the wheels of wheelchairs (in order to keep the wheelchair stationary while the user opens the door); these mats should be close-fitting, flush with the floor surface without protruding trim, and, if of the linked type, they must not have openings greater than 18 mm in diameter, which may catch the foot of walking sticks etc. Soft coconut matting should not be used, as this is difficult to traverse with wheelchairs or pushchairs.

Lighting

12. The lighting of entrance lobbies or their equivalent areas should be varied, in order to make a gradual transition between a bright outdoor environment and a more subdued interior. The recommended level for lighting in lobbies is 200 lux.

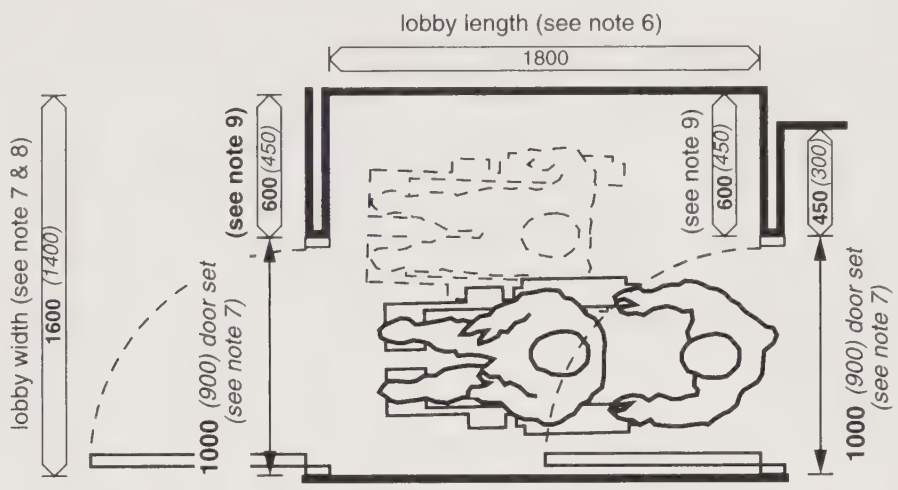
Activities:
Passing through entrance lobbies with single leaf doors.

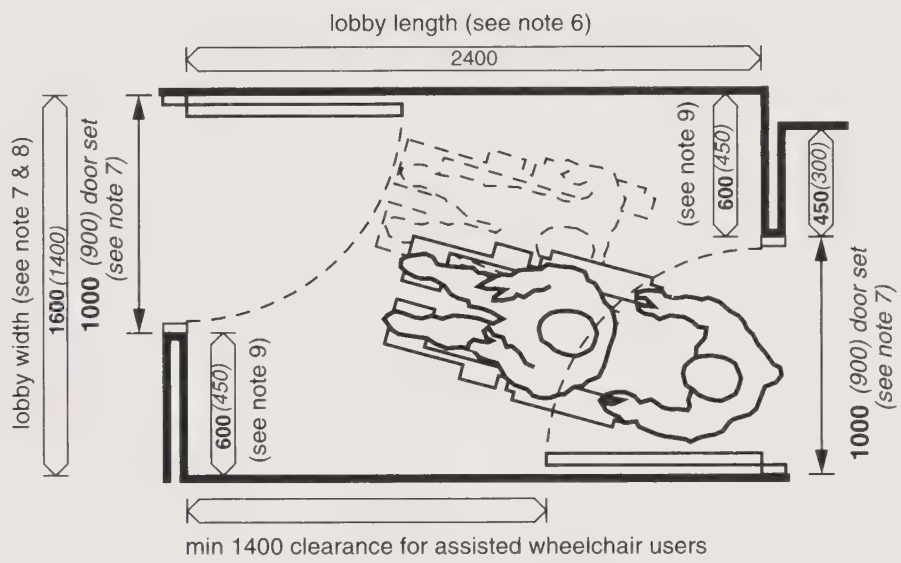
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

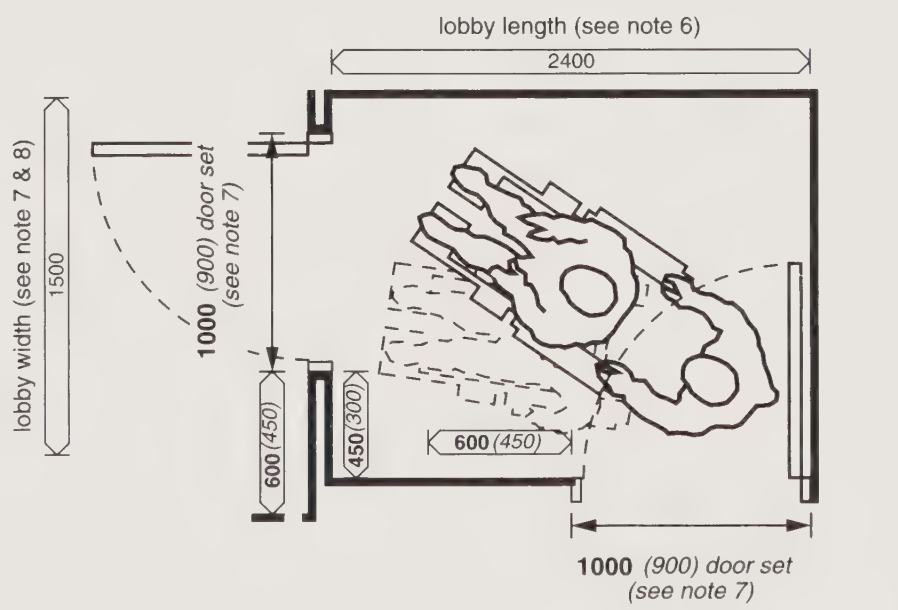
Lobbies 1

Single leaf doors

Users:
Ambulant and semi-ambulant and non ambulant (wheelchair) users







Notes:

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a. See notes on separate page.

b. All lobby lengths are between door faces.

c. The dimensions shown do not allow for handrails in the lobbies. Consideration should be given to providing handrails and the necessary additional space if required to provide for the semi ambulant. See data sheet on Handrails.

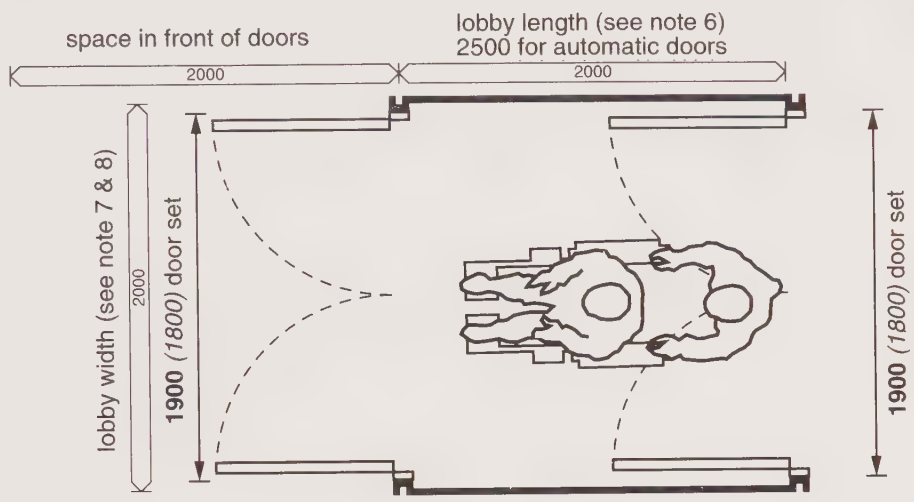
Activities:
Passing through entrance lobbies with double leaf doors

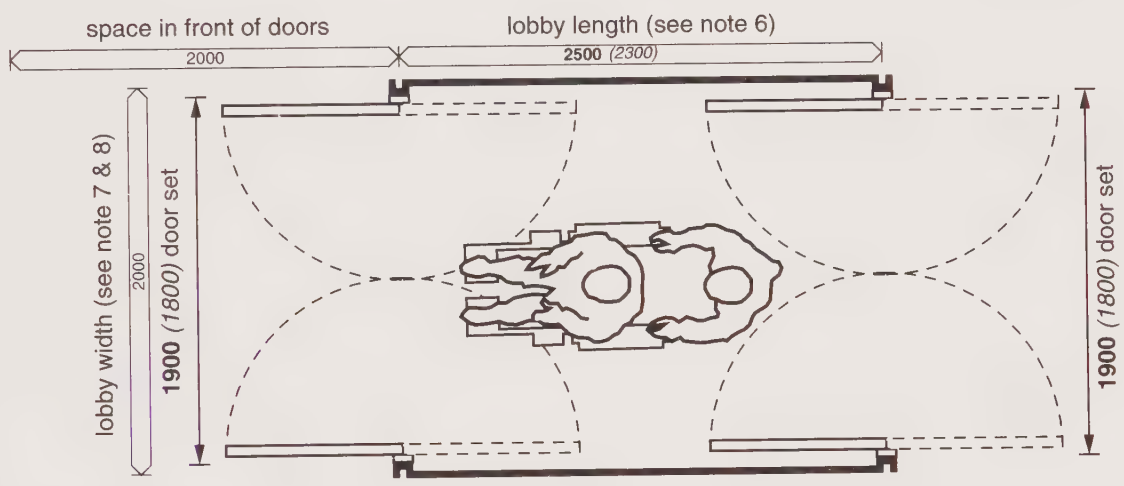
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

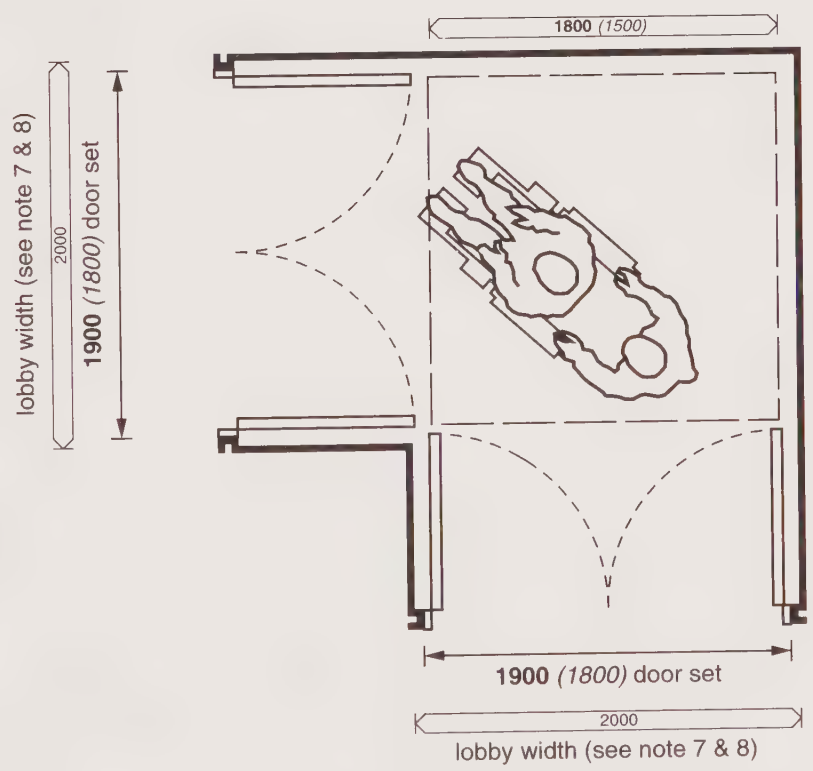
Lobbies 2

Double leaf doors

Users:
Ambulant and semi-ambulant and non ambulant (wheelchair) users







Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory n otes)*

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a. See notes on separate page.

b. All lobby lengths are between door faces.

c. The dimensions shown do not allow for handrails in the lobbies. Consideration should be given to providing handrails and the necessary additional space if required to provide for the semi ambulant. See data sheet on Handrails.

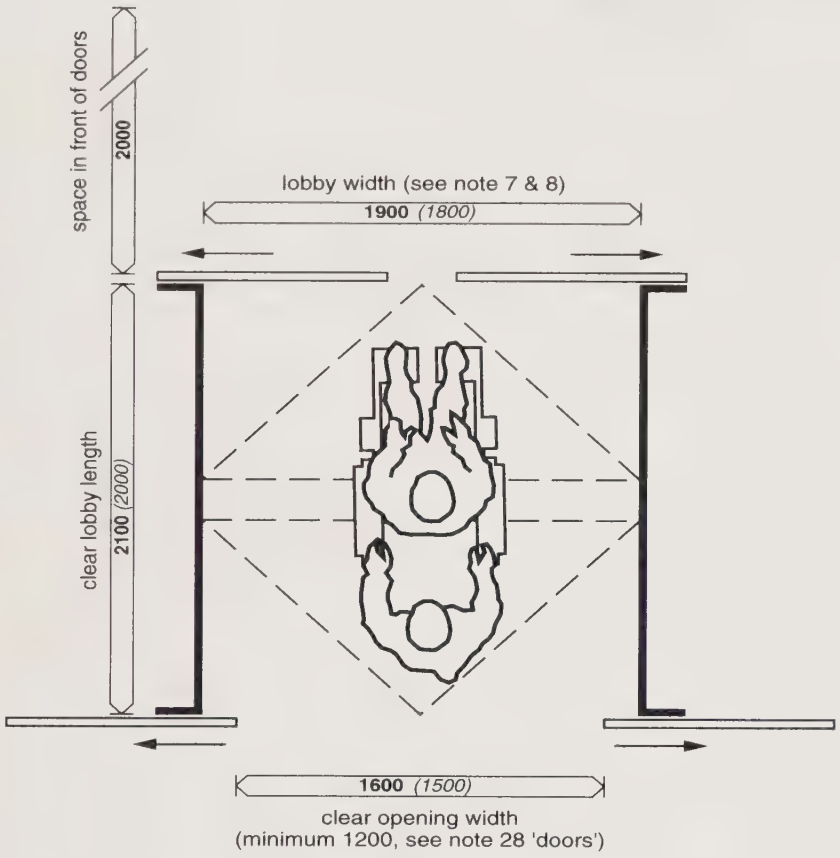
Activities:
Passing through 2 sets of automatic double doors which form a lobby. The lobby length should allow one set of doors to close before the other set is opened to minimise draughts.

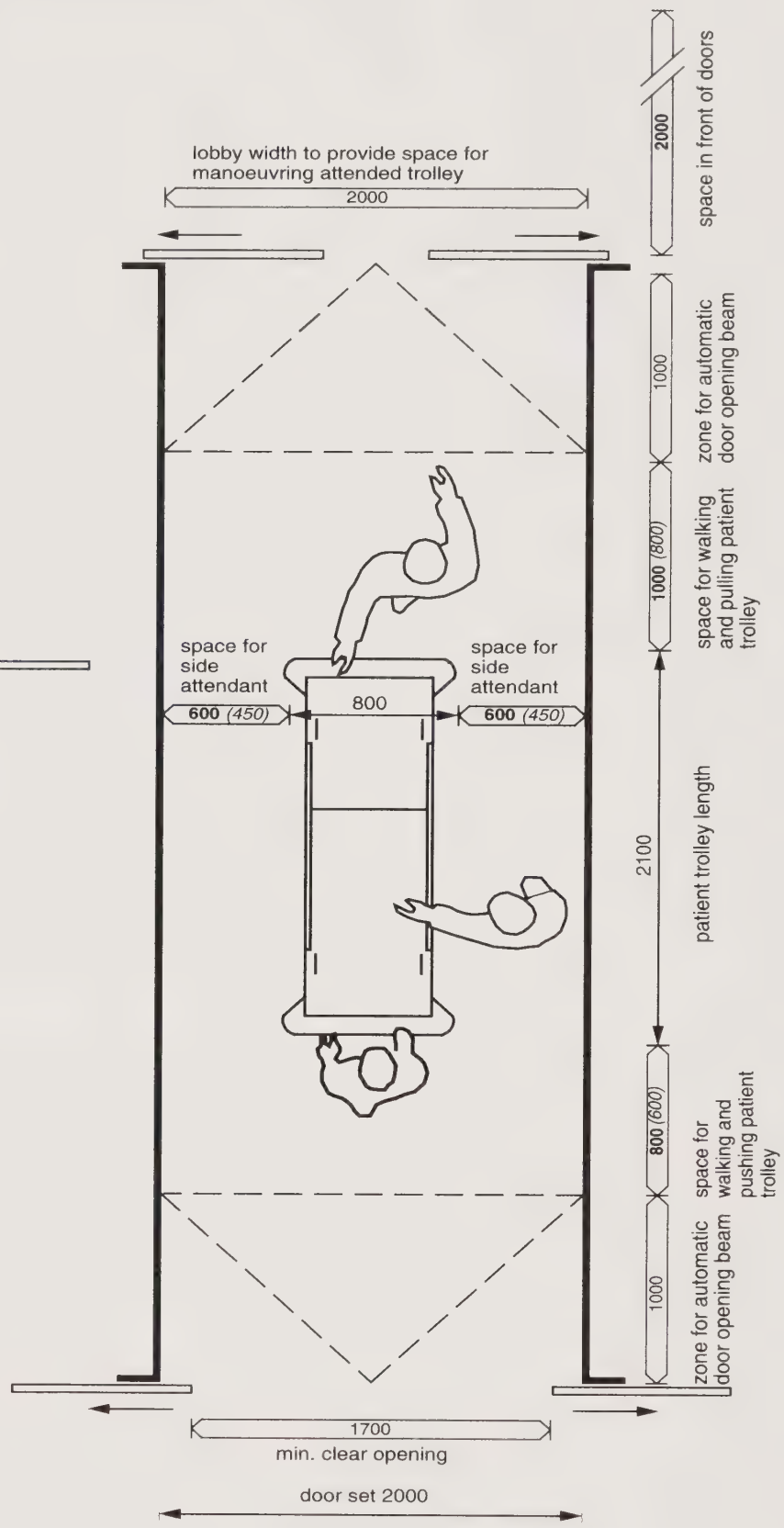
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Lobbies 3

Automatic sliding doors

Users:
Ambulant, semi and non-ambulant users





Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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a. See notes on separate page.

b. All lobby lengths are between door faces.

c. The dimensions shown do not allow for handrails in the lobbies. Consideration should be given to providing handrails and the necessary additional space if required to provide for the semi ambulant. See data sheet on Handrails.

6.5 Circulation and orientation

Signposting

(Notes to ergonomic data sheets)

General considerations

1. Reference should be made to HTM 65, 'Health signs'.

2. Signs are of three main types:

- informational – showing the availability of a facility/service;
- directional – generally in the form of an arrow pointing towards the facility/service;
- locational – the provision of an identifying sign at the actual site of the facility/service.

3. People using health buildings may be easily disorientated due to illness and/or upset; they may be in unfamiliar surroundings; they may have difficulties with sight, hearing, mobility or learning, or they may not have English as their first language; or they may need information to be presented at a lower level because they are in a wheelchair. If due consideration is given, at the design stage, to the information content, layout, presentation and location of signs and the provision of auditory information, these elements can all enable people to feel more confident and less anxious when using a health building.

4. Signs are an integral part of enhancing the accessibility and the usability of the buildings and their environment, and should be used effectively and sparingly to identify circulation directions, rooms, spaces, amenities, accessible entrances, emergency information, and also to indicate where help may be available, etc. Any signs used should follow the RNIB/GDBA Joint Mobility Unit guidelines.

Signs for people with special needs

Visually-impaired people

5. Factors such as the location of signs, size and type of characters, colour/tone contrast of text with background and background with wall surface, the use of tactile embossed lettering and general good standards and levels of lighting, will all enable visually-impaired people to find their way independently. Clear, audible information can also be a help. Although few visually-impaired people read Braille, this could be utilised in some areas where there are known to be more Braille users.

6. In areas where assistance is provided for visually-impaired people, the relevant internationally recognised symbol should be incorporated into the signage for those areas.

Hearing-impaired people

7. Hearing-impaired people rely heavily on visual information. They may find it difficult to register the content of spoken information, especially against a noisy background; in this context, the use of such aids as inductive loops may need to be considered.

8. Many hearing-impaired people, particularly the elderly, will also have a sight impairment. Many of the features which enable visually-impaired people to find their way will also therefore aid hearing-impaired people. Again, wherever specific assistance is provided for hearing-impaired people, the relevant internationally recognised symbol should be used on any signage.

People using wheelchairs for mobility

9. Because those sitting in a wheelchair have a lower line of sight than those standing, wheelchair users may be unable to see a sign positioned high on a wall; signs should therefore be placed at a sufficiently low level, and space may also be required in front of the sign so that people can park the wheelchair to read it.

10. Wherever facilities are provided for people in wheelchairs, the internationally recognised access symbol should be used. This symbol:

- should show the wheelchair facing to the right except when the direction signs point to the left.
- must only be used where facilities in buildings are fully accessible to disabled people; any buildings which incorporate only some "accessible" facilities should use the symbol in conjunction with words or pictograms to denote the extent of accessibility.

11. Any signs intended for use by those in wheelchairs should indicate the most convenient way for them to reach the facility concerned.

People with learning difficulties

12. People with learning difficulties may find it difficult to perceive, comprehend or interpret the information presented on signs; they have difficulty with orientation, and in some cases lack the ability to distinguish colours or differentiate left from right. Health buildings should therefore be designed with layouts which are simple and uniform, in order to be easily understood and assimilated by those who have restricted orientation capabilities.

People with linguistic difficulties

13. The specific needs of people with linguistic difficulties – for example, those whose first language is not English, or those who are illiterate – need to be considered in designing signs for health buildings. In some localities, bilingual signs may be required.

Route finding

14. A variety of methods to assist orientation and general route-finding can be used, to cater for people with different

levels and categories of ability; these methods include textured or coloured floor surfaces, tactile embossed plans, and coloured guiding lines on walls or floors. The effectiveness of such methods will largely be dependent on the way in which they are used to facilitate the location of such amenities as toilets, lifts, telephones.

Location of signs

15. Many people with disabilities have a restricted capability in their head and neck movements, which reduces their peripheral view. Signs must therefore be placed within the angle of normal sight (i.e., 30° from the centreline of the face from which a person can see to either side), taking into consideration the most appropriate viewing distance and direction. Where possible, signs must be positioned on walls to avoid creating hazards or obstacles. Any signposts must not obstruct otherwise accessible routes. (See 'Signposting 3' data sheet.)

16. Special attention should be paid to concealed barriers in circulation routes – for example, ramps or steps. Prior warning should be given, to allow disabled persons to assess the barrier and their capability of traversing it. It is also recommended that any ramps which are concealed from view are signposted, giving details of their gradient – and, if steeper than 1:20, also giving their length.

17. Signs should be located so that they are easily noticed and read by all. Some people will need to get close to a sign to read it, thus the approach space should be clear and unobstructed.

18. Directory boards should be located at all entrances to the building and on each level, showing directions to important facilities within the building such as the reception area, lifts, toilets, fire escapes, etc.

19. Special attention should be paid to signage for fire escapes and emergency assembly points, especially in multi-storey buildings. Fire exit doors are often sited away from the main circulation route, so it is important to provide adequate signage to these doors for the benefit of those unfamiliar with the building.

20. Signs should be positioned so that they form a logical sequence from the point of departure to the point of destination. They must be consistent in the terms and descriptions used throughout a route, and should be repeated at any changes of direction, intersections of routes or where changes in level occur.

21. Signs denoting parts of the building, rooms, etc should ideally not be located on the door to the area concerned, but rather at the side of any doors, pairs of doors or openings and within 150 mm of the door jamb. Signs should only be placed on doors where these have automatic closers and are unlikely to be propped open. In stairway areas, signs denoting floor level should be mounted permanently on the stairway side of the wall, on the latch side of the doors leading to exit stairways.

22. Signs should not be placed behind glass, as this can cause reflections (as well as problems of readability should the glass become defaced or smashed).

23. Signs should not project from the wall or hang from the ceiling, since any such signs would need to be above head height, with a minimum clearance which is compatible with an easy reading height.

24. Signs should not be located on inwardly-opening doors off corridors, since they are difficult to view because the face of the door is recessed from the wall.

Height and size of signs

25. Wall-mounted signs, including tactile ones, must be located between 1400 mm and 1600 mm from the floor, where they will be in constant view and not obstructed. This height allows both seated and standing persons to read them, if the letters are tactile embossed. The minimum height of the base of signs above the floor should be 750 mm. The top of signs should be at a maximum height of 2600 mm from the floor, and for any unavoidable suspended or protruding signs there must be headroom clearance of 2300 mm. Wall-mounted signs should have their centreline at a height of 1500 ± 25 mm from the floor.

26. The recommended height range for viewing from a standing position at a distance of 4–6 m is 1200– 1700 mm, with important signs at the optimum height of 1500 mm. It may be necessary to have larger signs at a higher level in areas where there is heavy pedestrian traffic and where there is a risk of visual obstructions.

27. The size of signs is important: a sign which is too small for its purpose may go unnoticed. Letters, numerals, symbols and pictographs should be large enough to be read easily from an appropriate distance – for example, symbols on lavatory doors in a corridor are likely to be read from a short distance, dependent on the width of the corridor, but "access" symbols in car parks denoting reserved places must be readable from a distance of several metres.

28. The characters used on signs should be of a plain font type – for example, not italic or highly stylised. A letter height of 15 mm minimum and 51 mm maximum, raised 1 mm and well spaced to allow individual letter discrimination, is recommended for the benefit of visually-impaired people. For a sign viewed at 3 m, the minimum recommended text size is 100 mm and the maximum 170 mm.

29. Symbol size will depend on the size of the sign, its location and purpose, also on how much text must be included in the sign. The sign must be legible and

recognisable. The following symbol sizes for different viewing distances are recommended:

Viewing distance (m)	Minimum size (mm)
0–7	60 × 60
7–18	110 × 110
18+	200 × 200
	max. 450 × 450

30. Further guidance regarding recommended character sizes for different types of sign, including details of various mandatory requirements, is contained in HTM 65, 'Health signs'.

Information design

31. Signs should present positive (not negative) information.

32. Signs should avoid the use of abbreviated words where possible. Short words should be used in preference to long words where meanings are equivalent. Words are easier to read if uppercase letters are only used for the first letter of a sentence and proper nouns, and lowercase for all other letters.

33. The colour of signs should also be consistent, and maintained throughout a building; characters, text and symbols on signs must contrast in colour and tone with their background, and the background should in turn contrast in colour and tone with the surface to which the sign is fixed. Note, however, that use of red and green together, or blue and yellow together, must be avoided as these are difficult to distinguish for people who are colour-blind.

34. Notice should also be taken of the mandatory use of certain colours and tones to denote such conditions as safety, prohibition, warning – see HTM 65 for specific guidance.

Tactile properties

35. Characters and symbols on doors and identifying spaces and directions in buildings should be raised so they may be distinguished by touch by the visually impaired. Engraved text, unless coloured, should be avoided, as the indents may fill with dirt or cleaning fluids etc and prevent their intended use. In addition, it must be remembered that engraved text cannot be touch-read by visually-impaired people.

36. If Braille is used, the Braille characters should be sited to the left of standard characters to make them convenient to read. Standard dot sizing and spacing, as used in Braille publications, can be adopted. The use of borders around sections of text is not advisable, unless it is set at a distance – otherwise it may cause confusion.

37. Simplified, tactile embossed plans should be made available to allow blind people and partially-sighted people to perceive their route by touch.

Lighting

38. Spaces should be well lit but not too bright so that the signs, coloured floor and wall surfaces, and the faces of people who give information, etc, can be seen easily. The colour of the lighting should not affect the colour of the signs. Careful consideration should be given to the position of items such as direction boards in lobbies, etc., which may often receive (unwanted) light or reflection from windows.

39. The position of the lighting must take into consideration the most frequent angle of view, and also any surrounding objects. The light falling on signs should not produce reflections or shadows, which would make them difficult to read. Additionally, signs should have a glare-free surface.

Audible information

40. Audible information (for example, where patients in a waiting area need to be called for appointment) must be clearly audible above ambient background noise.

41. Inductive loops and infra-red systems should be considered when providing facilities for hearing-impaired people. Receivers can be compatible with the T-switches on hearing aids.

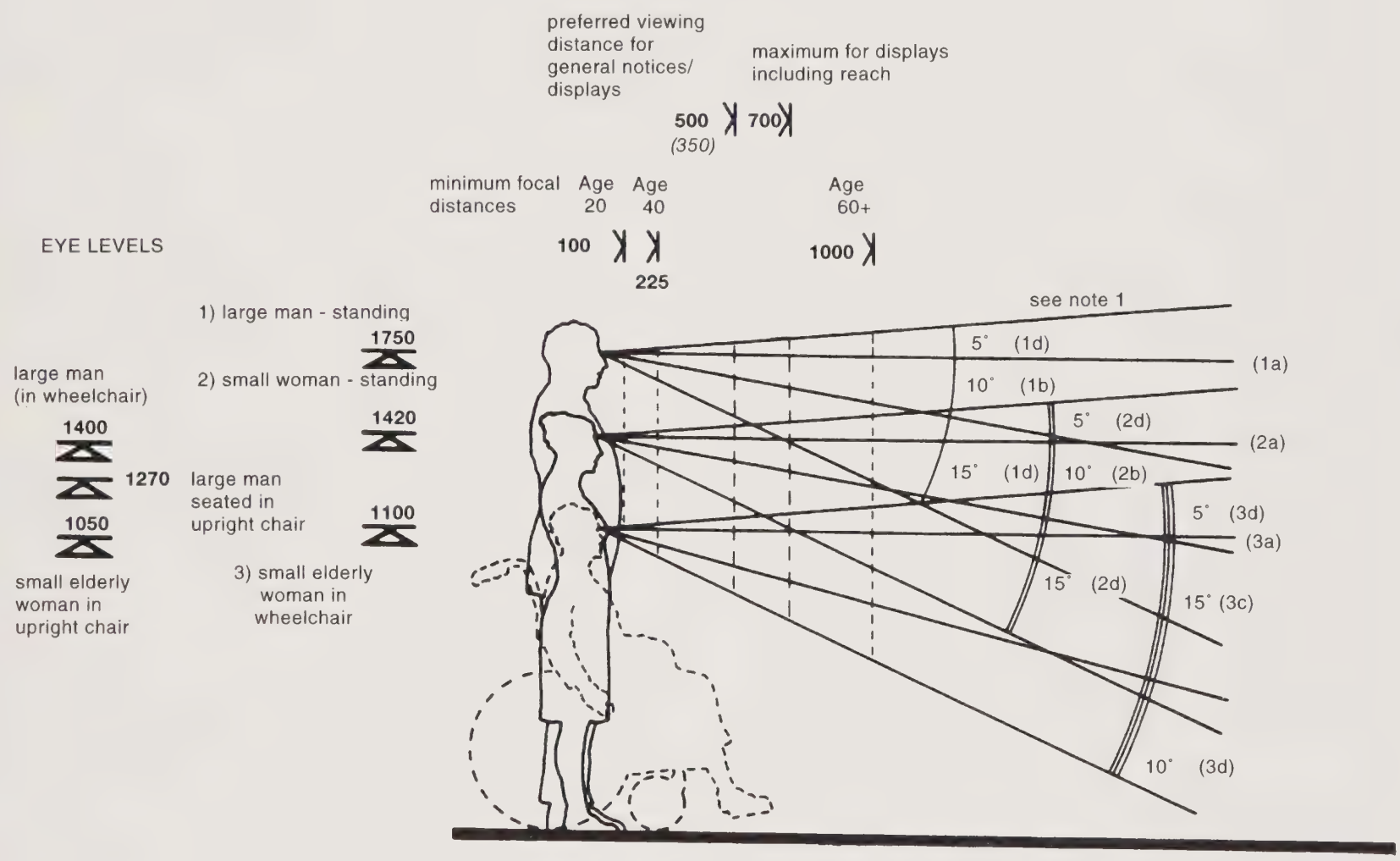
Activities:
Viewing signposts. See also Signposting (2), Viewing Distance/ Height and Signposting (3), Viewing Distance/ Width.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Signposting (1)

Eye Levels/Focal Distances, (General locational recommendations)

Users:
Patients, staff, visitors



Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Key to Sight Lines:

1) large man - standing
2) small woman - standing
3) small elderly woman in wheelchair

a) standard line of sight
b) normal line of sight - standing
c) normal line of sight - sitting
d) limits of vision without head movement
e.g. 2b = small woman, normal sight line - standing

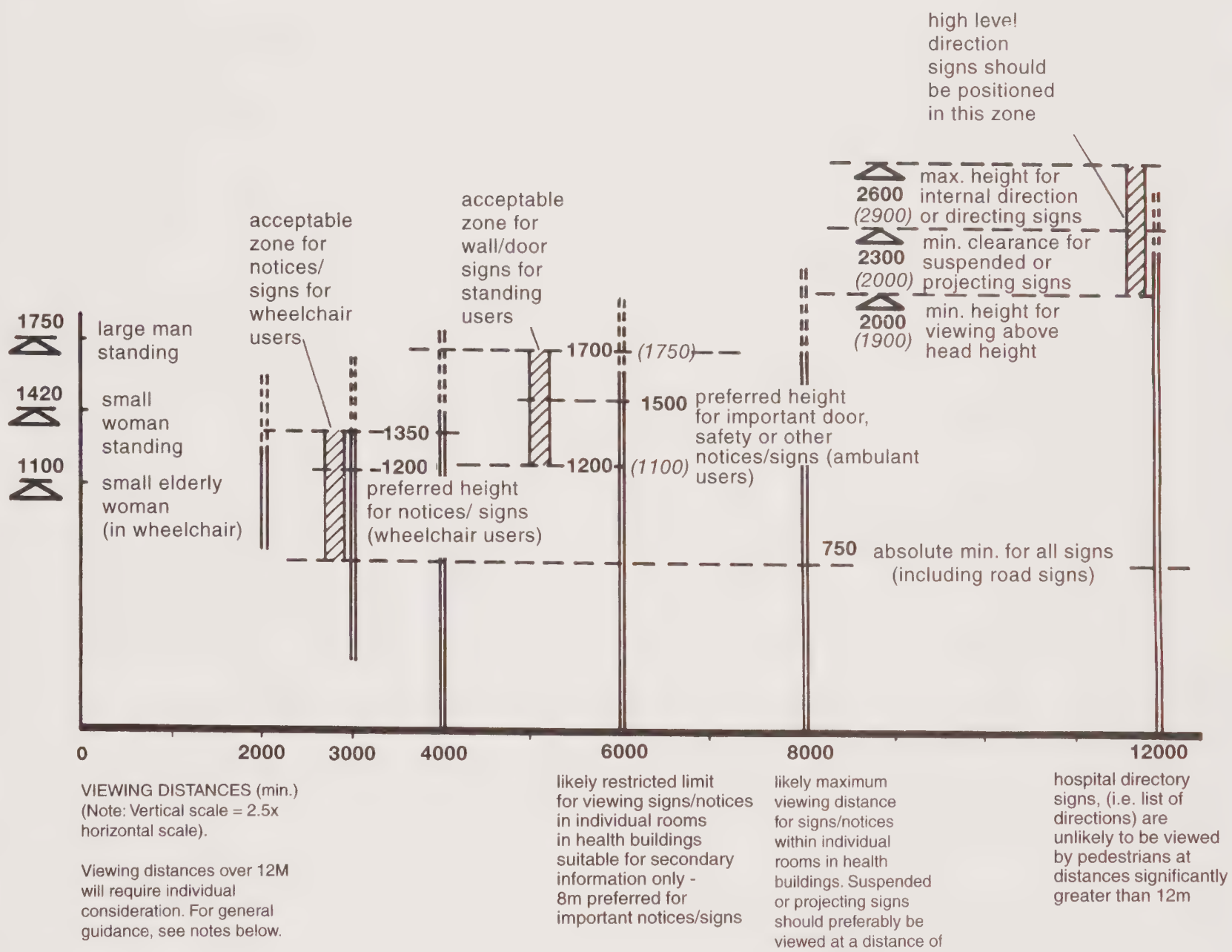
Activities:
Viewing signposts. See also Signposting (1), Eye Levels/ Focal Distances and Signposting (3), Viewing Distance/ Width.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Signposting (2)

Viewing Distances/Height (General locational recommendations)

Users:
Patients, staff, visitors



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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a. Traffic signs - see Traffic signs, Regulations and General Directions (1981) and Statutory Instrument No. 1536 (1975) Department of Transport.

b. See also, Health and Safety Executive - Safety, Signs Regulations (1980), BS 5499 part 1 (1982), BS 5378 parts 1,2,3 and BS 5376, all related to aspects of fire safety signs. The section referring to mandatory signs must be observed.

c. Viewing distances to letter height:-

Viewing distance (m)	Capital letter height (mm)	Lowercase letter height (mm)
1	80	50
2	130	100
3	200	150
4	260	200
6	400	300
8	520	400
12	800	600

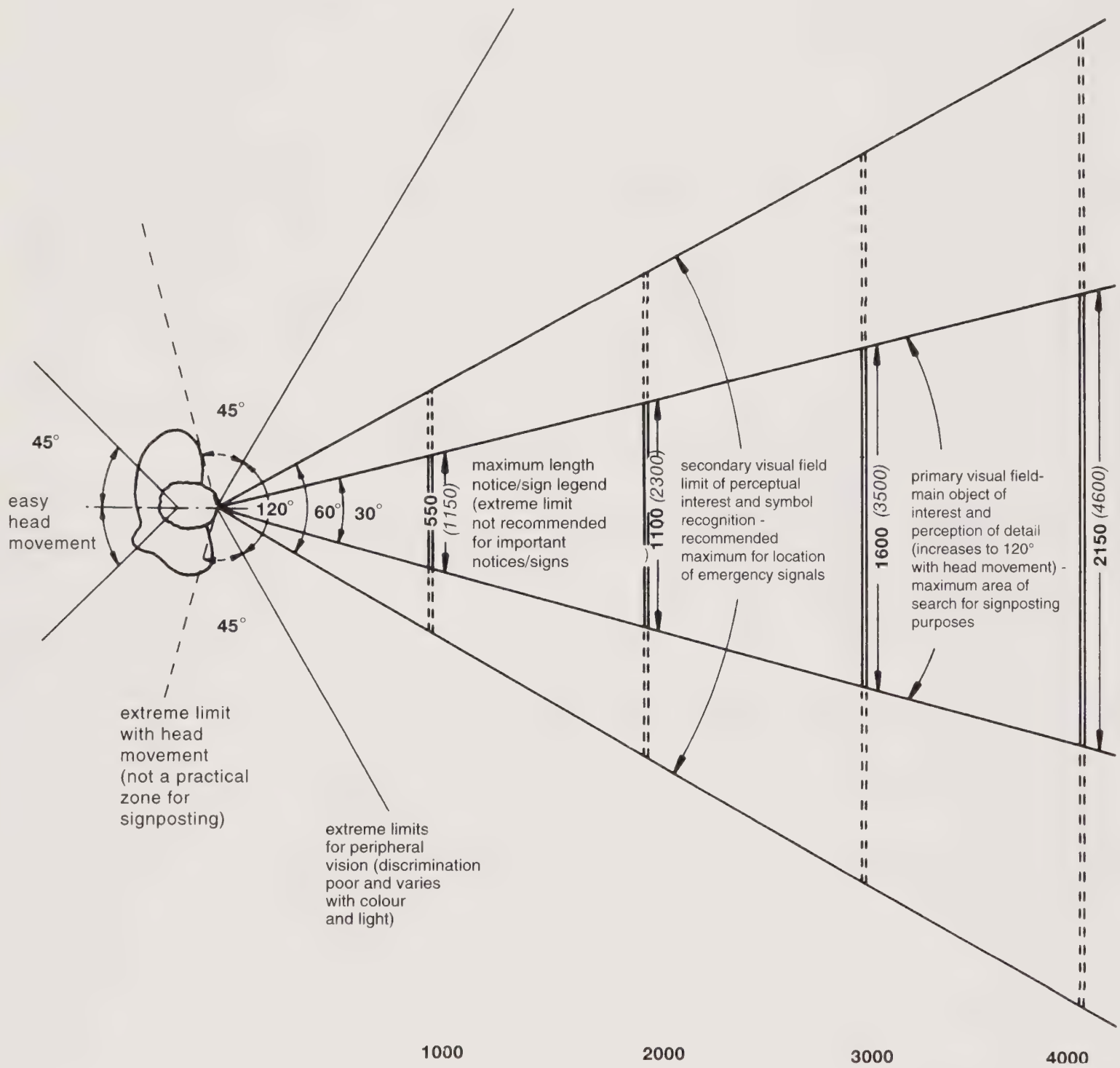
Activities:
Viewing signposts. See also Signposting (1), Eye Levels/ Focal Distances and Signposting (2), Viewing Distance/ Height.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Signposting (3)

Viewing Distances/Width (General locational recommendations)

Users:
Patients, staff, visitors



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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Internal stairs

(Notes to ergonomic data sheets)

General considerations

1. Reference should be made to the Building Regulations 1991, the Approved Document M of the Building Regulations 1991, the Building Standards (Scotland) Regulations 1990, Part T of the Technical Standards for compliance with the Building Standards (Scotland) Regulations 1990.

2. Stairs are a barrier to people in wheelchairs or those with pushchairs or prams. A ramp can be provided in some situations, which will also facilitate egress in an emergency (see data sheet for 'Ramps' above); however, ramps are generally not considered appropriate for any significant changes in level within a building.

3. The dimensions illustrated in this data sheet only provide for general ambulant and semi-ambulant access. (Reference should be made to HTM 81 and the 'Staircase, mattress evacuation' data sheets in Volume 4 of this Note with regard to the requirements for mattress evacuation.)

Approach and landings

4. People with impaired sight are at risk of tripping or losing their balance when meeting sudden changes in level; the risk is greatest when approaching the head of a flight of steps. The existence of steps, on their own or within a flight, should be made apparent; stairs should be designed so that they are not a continuation of the line of normal pedestrian travel.

5. The clear, unobstructed length of landings in hospitals should be 1500 mm (1200 mm minimum). The top and bottom steps of a flight should not encroach onto the landing area.

Height

6. The maximum permitted height for the rise of a flight of internal stairs between landings is 1800 mm.

Risers and goings

7. Risers and goings should be uniform throughout the flight, as any irregularities can cause people to stumble. Risers should not be of the open type. The minimum internal going is 280 mm.

Nosings

8. Nosings should be marked in a colour/tone that contrasts with the colour of the stairs, extending the full width of the step, and reaching a depth of 50–60 mm on both tread and riser, to allow visually-impaired people to detect the edge of each step. Any edges should be firmly fixed and be of a non-slip type. Although rounded nosings can cause slipping, sharp nosings and abrupt angles should still be avoided.

Edge protection

9. It is necessary to prevent feet, crutches and sticks from accidentally slipping off the edge of open-plan steps. For steps not adjacent to walls, a barrier, with a maximum height of 100 mm above the level of the treads, should be provided.

Step surface and type

10. The surface of the steps must be (and appear to be) non-slip, and to aid visually-impaired people the risers should be a contrasting colour to the treads.

11. Stair finishes must not have patterns which cause step edges to be indistinguishable to visually-impaired people, or which can otherwise cause visual confusion of any kind.

12. A change in surface texture at the top and bottom of the steps is needed, to act as a warning for visually-impaired people that there is a change in level ahead. This surface should be of a corduroy texture.

13. Distractions should be avoided, especially at the top of steps where people may lose their concentration as well as their footing.

14. In addition, the use of open risers is not recommended, since open risers are hazardous to all users; they are especially dangerous for the ambulant disabled with leg braces and prostheses, who need a solid riser to guide their feet onto the next tread. Open risers allow feet to catch on the underside of the tread, and are therefore hazar dous to those using sticks and canes.

15. Open areas on the underside of stairs should also be avoided, to eliminate the possibility of anyone – including the fully-sighted – walking into the overhang created. If enclosure is not possible, then two rails – one at 1000 mm, and one at 200 mm above floor level for cane users – or some other strategically placed, permanent barrier, should be provided.

16. Single steps and any changes in level less than 100 mm are to be avoided, as are helical and spiral steps (the treads of which are often too narrow).

Width of steps

17. The steps must be wide enough for people to negotiate comfortably by holding onto either one or both handrails or by being assisted. The width of the steps should reflect the amount of pedestrian traffic (reference should be made to the "person" ergonomic data sheets in this volume for further information on space requirements for users and assistants).

18. A minimum clear step width of 1000 mm for one person, or 1500 mm for two-way traffic, is necessary. A middle handrail should be provided on any flights of steps wider than 1800 mm. It is recommended that channels are a minimum of 1000 mm wide, to ensure that people can use both handrails if they wish.

Handrails

19. Reference should be made to the 'Handrails' ergonomic data sheet later in this section for further guidance.

20. Handrails are required by some users to help them to pull up steps; they are also used for balance and support when descending. Handrail extensions also provide tactile cues to the presence of changes in level for visually-impaired people.

21. Handrails:

- must continue for a minimum of 300 mm horizontally from the top step; where the handrail does not interrupt pedestrian routes, an extension of 450 mm from the top step is recommended. Central handrails may project into the landing by the same amount as the going;
- must be located within the width of the tread; and
- should be provided on both sides of the steps, in order to assist people with left or right disabilities, those using a walking stick or those carrying a bag in one hand.

Balustrades

22. Balustrades should be provided around landings to a height of 1100 mm, to prevent people falling. They should not allow young children to fall between the gaps (which should be no wider than 100 mm), nor provide toeholds for climbing up.

Lighting

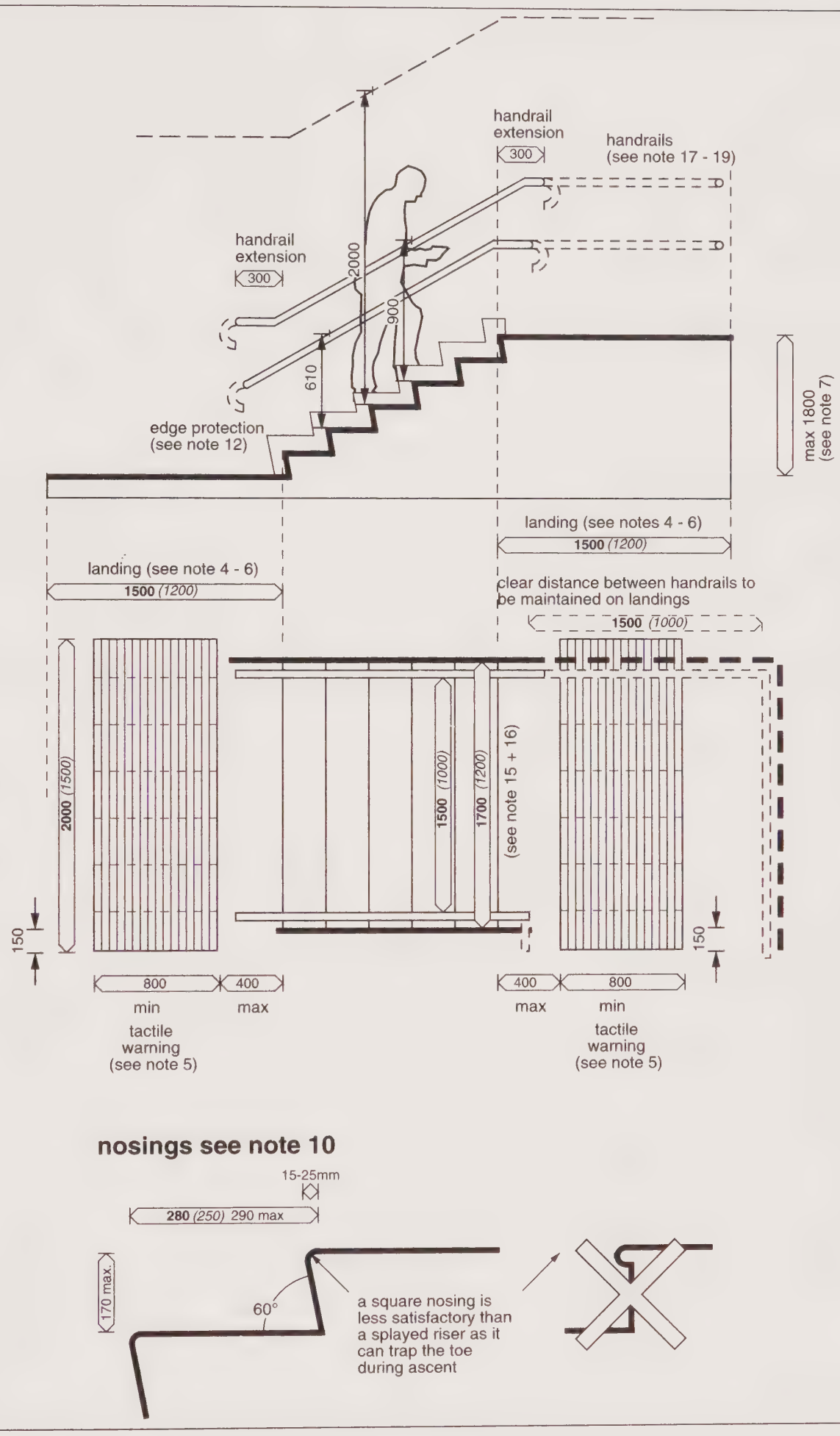
23. Stairs and landings should be well illuminated, either naturally or by artificial means. The lighting should be designed so that it highlights the differences between risers and treads, the top and bottom steps, and any changes in direction.

Activities:
Walking up and down stairs.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Internal Stairs

Users:
Ambulant and semi-ambulant users with and without assistance



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes on opposite page.

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Corridors

(Notes to ergonomic data sheets)

General considerations

1. The dimensions shown only provide for the general circulation of ambulant, semi-ambulant and wheelchair users. (Reference should be made to the 'Bed' and 'Trolley' data sheets in Volume 4 of this Note for the requirements for moving these items of equipment.)

2. Corridors connect spaces, and in emergencies form part of escape routes. They must be simple and safe to negotiate, and should convey information about a building in order to aid the building's users to circulate within it.

3. The data sheets 'Doors' and 'Lobbies' elsewhere in this volume provide further information.

Corridor width

4. Corridors should be wide enough to allow people in wheelchairs, those propelling pushchairs or catering trolleys etc., and those using walking aids, to turn, pass others and negotiate doorways.

5. Corridor widths should be unobstructed, and any projections should be avoided – for example, by recessing radiators and essential items of equipment such as fire extinguishers. Outward opening doors are hazardous to visually-impaired people, and are therefore not recommended.

6. Corners should be carefully detailed; splayed or rounded angles are helpful, as wall surfaces are likely to be touched by people who require a tactile knowledge of the building or the use of handrails for support.

7. The minimum recommended corridor width is generally 1500 mm, but a clear width of 1300 mm is permissible if between handrails, which will enable ambulant disabled people to be assisted. (Reference should be made to the 'person' and 'Wheelchair' ergonomic data sheets in this volume for further guidance regarding space requirements for wheelchair users and their assistants, in order to evaluate the corridor width required.)

Handrails

8. Handrails are required to provide support, balance and direction; they should be provided on both sides of a corridor, and should return into doorways and openings but otherwise be continuous to a positive location to avoid confusing those who will be following them. (See notes to 'Handrails' data sheet later in this volume.)

Decor

9. Excessively monochromatic corridor colour schemes should be avoided. Tonal contrast is as important as colour contrast, as some conditions of visual impairment can confuse different colours of similar tone.

Colour and contrast can be used to:

- highlight specific features, for example lifts, stairs, doors, handrails, light switches and litter bins;
- provide visual information by distinguishing floor, wall and ceiling planes;

10. Wall coverings should not be too "busy" or otherwise distracting, since it can be difficult for people with hearing impairments to concentrate when lip-reading a speaker when such walls are directly behind them.

11. Bright, boldly-patterned flooring should be avoided, as it can create a confusing and unpleasant impression for visually-impaired people in particular.

Surfaces

12. Wall and floor surfaces should have a matt finish, to minimise reflections of light and sound reverberation, which can both cause confusion for people with sensory impairments.

13. For ease of mobility of physically disabled people, the use of heavily resilient floor finishes (such as thick carpet) should be avoided in corridors.

14. Careful use of changes in floor texture/absorbency can help people to locate key building elements such as lift landings, and can advise them of potential hazards.

15. Junctions between different flooring materials should be carefully detailed so that they do not constitute an obstacle to wheelchair users or a tripping hazard – either to ambulant disabled people or to those with impaired sight.

16. Floor surfaces should be non-slip (whether wet or dry); this is particularly important in areas used by elderly people and by those using sticks and crutches.

Lighting

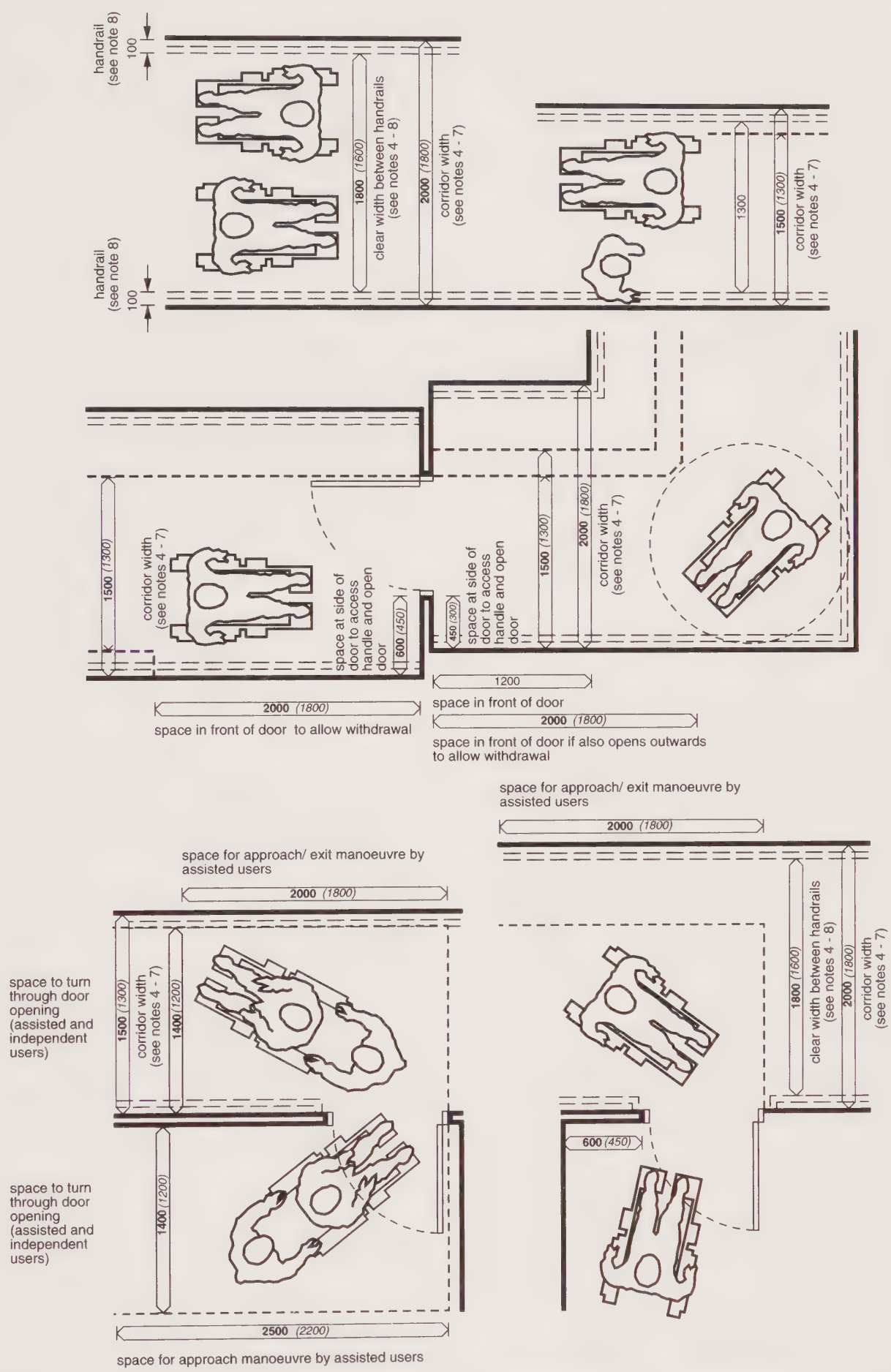
17. Lighting should create neither shadow nor glare. Windows should not be situated at the ends of corridors.

Activities:
Moving along a circulation route, passing others and passing through doors.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Corridors

Users:
Ambulant, semi-ambulant and non-ambulant (wheelchair) users with or without assistance



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes on opposite page.

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Handrails

(Notes to ergonomic data sheets)

General considerations

1. Many people rely on handrails for balance and support, particularly when walking up and down steps, stairs and ramps, but also when in lifts and moving along corridors. In ascent, handrails are grasped at intervals, whereas during descent hands are usually slid continuously down them. Handrails are important for wheelchair users to hold onto when resting on ramps. Handrails also provide safety barriers on open ramps and stairways.

Appearance/texture

2. Handrails:

- should be easily visible in advance, and be of a contrasting colour to the surface to which they are fixed;
- should be smooth, and free of any abrasive elements;
- should be neither too cold nor too hot to the touch, especially those which are situated outdoors;
- can have raised indicators built in, to convey such information as floor level.

Shape and size

3. Handrails should be easy to grasp, and the shape and size must allow a firm but comfortable grip with the whole hand. Handrails which are too small are uncomfortable and provide an unsatisfactory grip, whereas handrails which are too large are difficult to grip for people with weak or arthritic hands. A round cross-section is recommended; this type of handrail is easiest to grip, and should ideally have a diameter of between 45 mm and 50 mm; the next most acceptable handrails are oval, measuring between 18 mm and 37 mm horizontally and between 32 mm and 50 mm vertically. (Whilst other shapes may also be acceptable, handrails with a large, square or vertically-mounted and rectangular cross-section should be avoided.)

Clearance

4. Handrails must allow enough space between them and the adjacent walls or other obstacles for fingers and hands to pass without scraping knuckles. (A clearance of 60 mm is preferred; although a minimum clearance of 45 mm complies with Approved Document M of the Building Regulations, this is uncomfortably tight for arthritic hands, especially if gloves are worn.)

5. Recessed handrail sections are not satisfactory, since they cannot be leant on for support. If this solution is unavoidable, any recesses containing handrails should extend for 250 mm above the top of the rail.

Height

6. The top of the handrail should ideally be 900 mm above the surface of the ramp or pitch line of a flight of steps; a second, lower, rail – the top of which should be at a height of 610 mm – should also be provided, for the benefit of wheelchair users and children.

Extent

7. Continuous handrails on stairways and landings help visually-impaired people to negotiate changes in direction. Handrails should therefore be continuous around the inside of dog-legs on stairways and ramps and continue around intermediate landings. Vertical handrail risers on turns, or any interruption of handrails to accommodate newel posts and supports, should be avoided.

8. Handrail extensions provide tactile cues as to the presence of changes in level for visually-impaired people; they should extend horizontally for 300 mm past each end of the feature, and where they do not interrupt pedestrian routes an extension of 450 mm is recommended. They should return to the wall or floor or at least 100 mm downwards, and should not project into any pedestrian routes.

9. A central handrail of a stairway may project into the landing by the same amount as the going.

Distance between rails

10. For guidance regarding the recommended distance between handrails on corridors, steps and ramps, reference should be made to the relevant data sheets elsewhere in this volume.

Withstandable force

11. Handrails should be rigid, securely fixed and able to support the weight of a person leaning on them. They should be able to withstand a concentrated momentary horizontal force of 91 kg applied to the top edge and 30% of that vertically down, and they should be able to withstand a minimum vertical load or horizontal pull of 1.33 kN.

Balustrades

12. Balustrades must be provided around landings to a height of 1100 mm, to prevent people falling. They should not allow young children to fall between the gaps (which should be no wider than 100 mm), nor provide toeholds for climbing up.

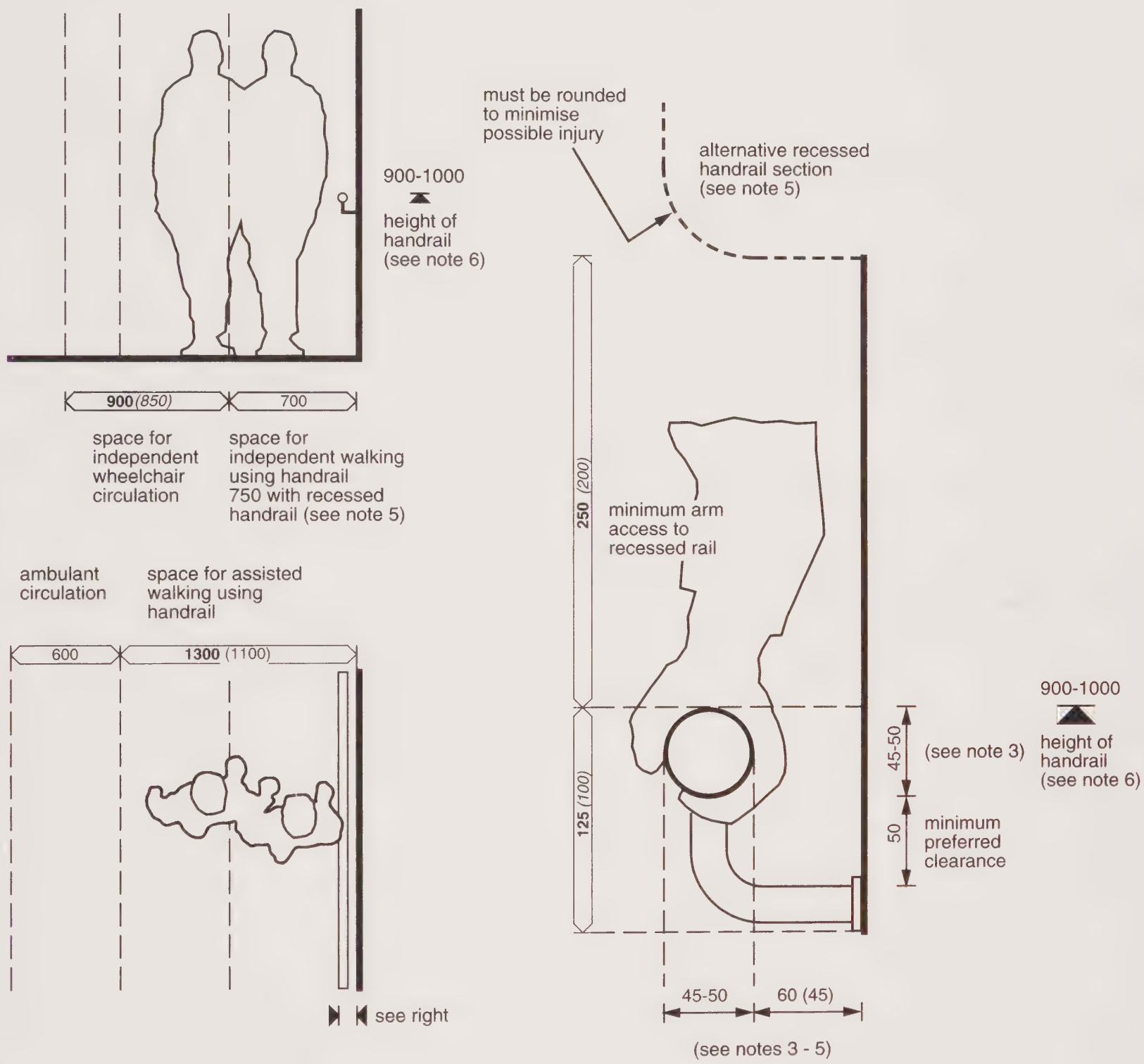
Activities:
Walking, ascending and descending steps or a ramp using wall mounted handrail.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Handrail

Wall mounted

Users:
Ambulant, semi and non-ambulant users



Notes:

a. See notes on opposite page.

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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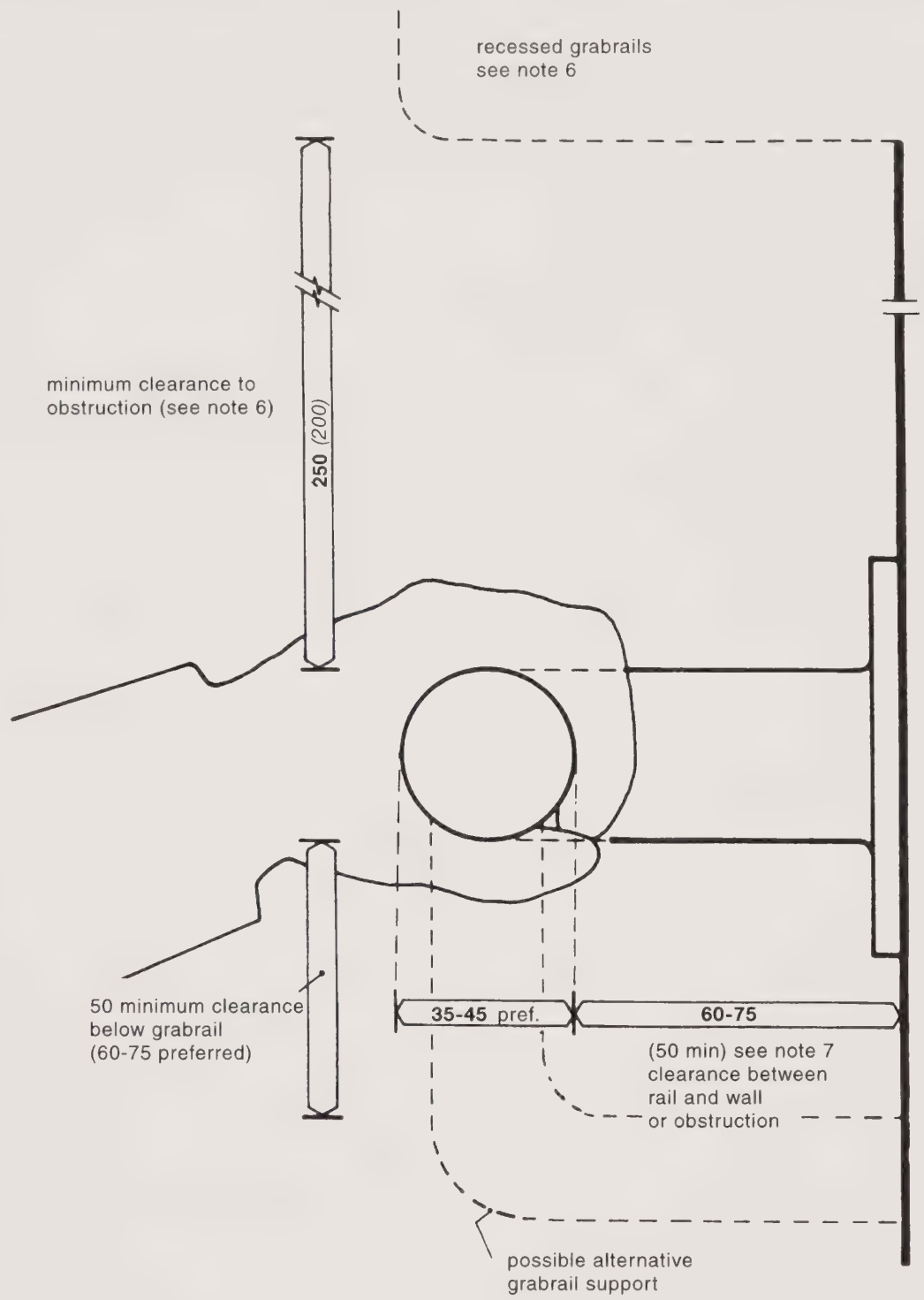
Activities:
For leverage and support when raising and lowering from sitting

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Grabrail

Users:
Ambulant and semi-ambulant users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Where people need handrails to assist them in sitting down horizontal grabrails are required, at a height of 750 - 800 so that they can push down on them, though some people, e.g. those with arthritis in the shoulders find this a painful, if not impossible, action in which case vertical handrails would be preferred.

2. Minimum length of rail (internal)
One hand = 300
Two hands = 600
A minimum length of 600 provides better lateral stability.

3. For standing up, to provide support when standing, e.g. in the bathroom or when a pulling motion is required, e.g. in opening a door vertical handles are required at a height of 900 - 1500. The person is at a better mechanical advantage because more force can be exerted using less strength with the arm in this relationship to the body. Also people of different statures can grip the grabrail at the most appropriate height for them.

4. The finish on the grabrail should be non-slip.

5. Horizontal grabrails are preferred as people tend to push on them to get up or sit down. If the pulling motion is required the grabrail should be vertical, but restricted in length to one or two handed grip, as required (recommended maximum (x) length 200 and 500 respectively).

6. Recessed grabrails are not generally satisfactory and should be avoided in patient areas. A minimum clearance of 250mm above a grabrail should be provided and all corners or sharp edges rounded or eliminated. Adjacent surfaces should not be abrasive.

7. Restricted space should not be used for external grabrails as this dimension will not accommodate gloved hands, particularly where users are arthritic.

8. See also notes on data sheet Handrails.

6.6 Toilets

(Notes to ergonomic data sheets)

General considerations

1. The space/spaces required vary depending upon the range of users and components to be accommodated. The space allowed for activities should take into account the varying degrees of assistance that may be required, and the fact that some users may be relatively inexperienced at manoeuvring a wheelchair or using any other aid to mobility.

2. Disabled users of the building (whether patients, visitors or staff) should not have to travel further, or make more effort than other users, to use a toilet. Consideration should be given to whether the overall toilet provision is adequate for the needs of particular ethnic groups if it is likely that there will be a significant number of users from any such group.

3. Accessible toilet facilities must be reached along fully accessible routes, and clearly indicated (see data sheets for 'Corridors' and 'Signposting' earlier in this volume).

4. Toilet facilities should not be located within lobby areas if at all possible, since their doors and confined spaces can be difficult for people with problems of mobility and hand function, and also for those who use wheelchairs, to negotiate. However, privacy should always be maintained; toilet doors should therefore not open directly off busy circulation spaces, or the layout should be such that the open door does not give a view of the interior of the toilet. In assisted WCs where this is not possible, a curtain should be provided to ensure that the patient using the toilet cannot be seen from the adjacent corridor or activity space.

5. Toilet facilities for wheelchair users can be provided either on a "unisex" or "integral" basis. A "unisex" facility is approached separately from other sanitary accommodation; it has practical advantages, in that it is more easily identified, it permits assistance by a companion of either sex, and it can be used by others who require more space (such as those with a pushchair, child or guide dog). It is less demanding of space than an "integral" toilet facility, which effectively has to be duplicated in order to achieve the same level of provision for both sexes. (An "integral" facility is contained within each of the separate provisions for male and female users, thus precluding assistance from a companion of the opposite sex.)

6. Whether toilet compartments for wheelchair users are designed on a "unisex" or "integral" basis, they should be similar in layout and content, and should satisfy the following needs: to achieve necessary wheelchair manoeuvre; to allow for frontal, lateral, diagonal and backward transfer onto (and off) the toilet; to provide facilities for handwashing and hand drying within reach of the toilet, prior to transfer back onto the wheelchair; and to have sufficient space to allow a helper to assist in the transfer. Where more than one type of toilet is made available, it is suggested that mirrored unisex facilities would best meet the needs of individual preferences.

7. All fittings (toilet, basin, etc.) should be securely fixed, since people may need to lean on them or grip them for support.

Toilet

8. The shape of the toilet pan and bowl is important. Many wheelchair users and ambulant disabled people need to cleanse themselves while still sitting on the toilet, so it is useful if the pan offers a wide opening, and the water level should not be less than 200 mm from the rim. The toilet pan should be made of tough material, the pan fixing must be strong, and effective seat stabilisers are important. It is especially important to avoid any sharp edges and rough surfaces.

9. Some users will only be able to use one hand, so the toilet-paper dispenser must be within easy reach and should dispense individual sheets – or otherwise incorporate a locking device which allows sheets to be easily torn off with one hand.

10. Provision of a toilet lid will prevent use of the horizontal rail behind the pan.

11. A black or dark toilet seat should be fitted to a white ceramic WC unit, thus providing good colour contrast and helping the intended user to locate the facility.

Basin

12. The basin and soap dispenser should be positioned so that they can be reached while sitting on the toilet, and should be contrasted in colour and tone with the surface to which they are fixed. This will assist the visually-impaired, and will allow hands and other parts of the body to be washed before transferring back onto the wheelchair (thus avoiding the possibility of staining clothes or the wheelchair).

13. Handrinse facilities vary from 350 mm to 450 mm in size. Basins which project for less than 300 mm tend to be very unsatisfactory in that they do not adequately contain splashing, whereas basins over 350 mm deep require an excessive sideways reach from the WC seat to acccess taps etc. Recessed basins are generally not favoured, because they tend to be too shallow and restrict access for – and movement of hands by – some disabled users.

14. To facilitate good access to the basin, the centre line of the bowl should not be forward of the front edge of the WC seat. Where the taps are positioned on the far side of the basin, the preferred location of the basin is set back between 200 mm and 250 mm from the front edge of the WC.

15. The towel dispenser must be within easy reach, to allow users to dry themselves.

16. Fittings such as toilet flush and taps should be equipped with lever handles, since these do not require the ability to grip and can even be operated using an elbow.

Bins

17. Some people may wear bags which need to be emptied into the toilet, or they may wear disposable colostomy/ileostomy bags or incontinence pads. A suitable sealed bin should be provided for the disposal of these; this must be positioned within easy reach of the toilet and where it does not obstruct circulation space.

18. A bin will also be required if paper towels are provided; paper or cloth towels (which do not require strength to pull) are preferred to hand dryers, which have limited application for people with disabilities.

Rails

19. Rails are used to provide support and stability when transferring, sitting down and standing up, and while adjusting clothing. The hinged fold-down rail is used in combination with a fixed wall rail by relatively independent users to provide support when lowering themselves onto the seat. Vertical rails are used for pulling back up to a standing position, and they are also important for a male standing to urinate when sticks and crutches have been discarded. (See the 'Grabrails' data sheet earlier in this volume.)

20. Grabrails must be positioned symmetrically over the toilet, and should be contrasting in colour and tone with the surface to which they are fixed. The 700 mm dimension allows access to the toilet by patients on wheeled sanitary chairs; this dimension must not be exceeded, since it will significantly reduce the effectiveness of the handrails as an aid to users.

Help call facility

21. An alarm cord, reachable from the toilet/basin area and the floor, must be fitted; it should be differentiated, both in colour/tone and diameter, from the light pull cord.

Floor and wall surfaces

22. Good lighting and colour contrasting between floors and walls, and also between fixtures, walls and fittings such as toilet seats, enable those with impaired sight to use the facilities more easily and safely.

23. The floor must be non-slip, even when wet.

Doors

24. The leading edge of the door should be in the middle of the room, not the corner. The door should open out, but if inward opening is unavoidable the room depth must be increased to clear the door swing. It must be possible to open the door outwards in an emergency.

Minimum requirements

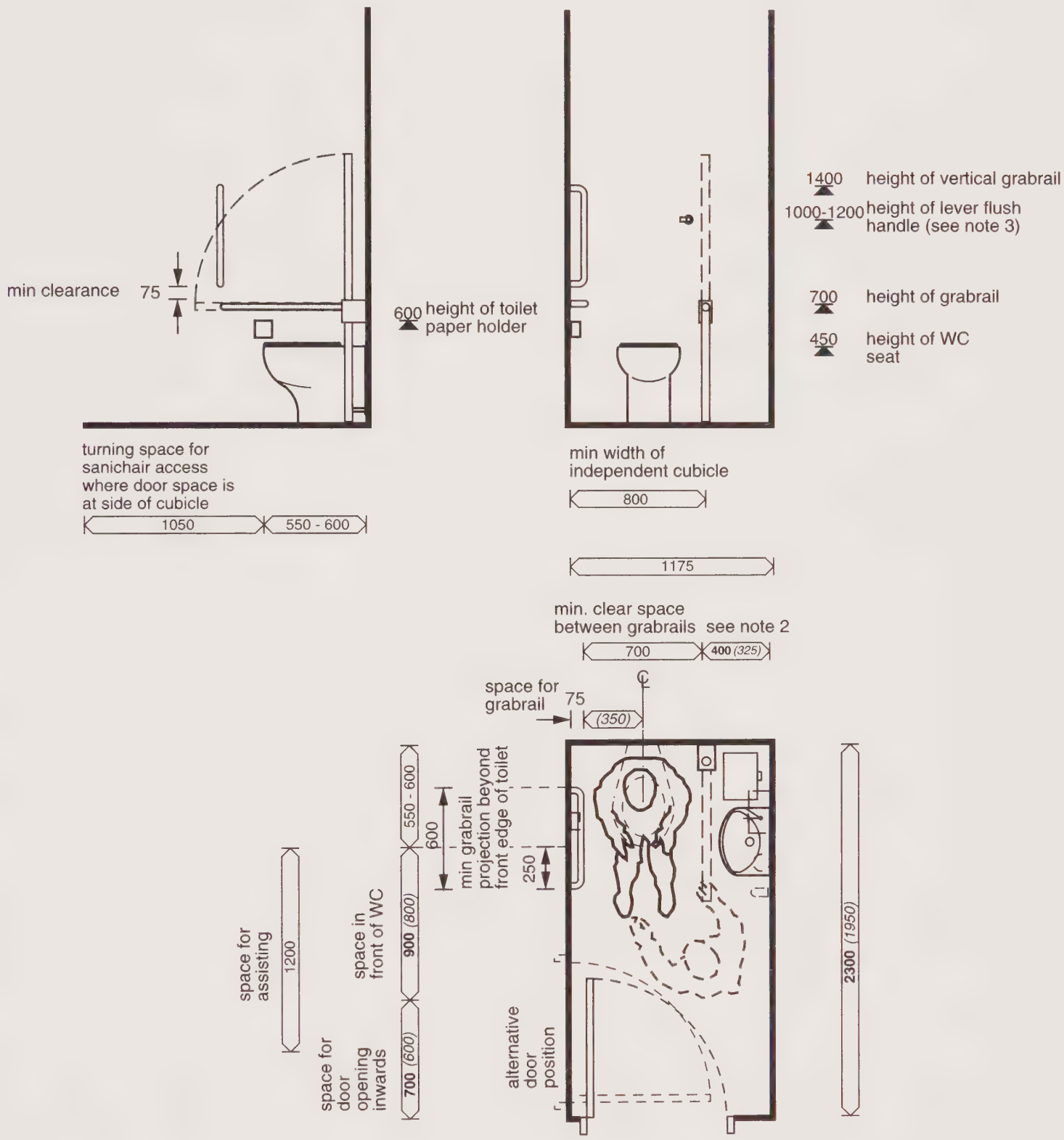
25. To comply with statutory requirements, a WC must have as minimum provision the dimensions, equipment and fittings shown in diagram 10 of Approved Document M of the Building Regulations.

Activities:
Use of WC and handrinse facilities with front access space for assistant.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Toilets 2

Users:
Ambulant, semi-ambulant, assisted or independent (also sanitary chair users)



Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. This layout allows space for entry with a child or bags etc. Where several unisex or ambulant WCs are provided they should be handed.

2. When the hinged grabrail is in the raised position, a dimension of 600 (rather than 400 *(325)*) allows side access for assistant.

3. Flush handles below 1100 will obstruct positioning of a sanitary chair over the WC.

4. Floors should be slip resistant and in contrasting colour to the walls and WC. Floors should not be shiny or cause reflections or glare since this causes confusion for people with sight impairments. The colour or tone of the background should allow grabrails and sanitary fittings to be easily distinguished.

5. An alarm cord, reachable from the toilet/ basin and floor must be fitted.

6. Where assistance is minimal, the cubicle width can be reduced to 1100.

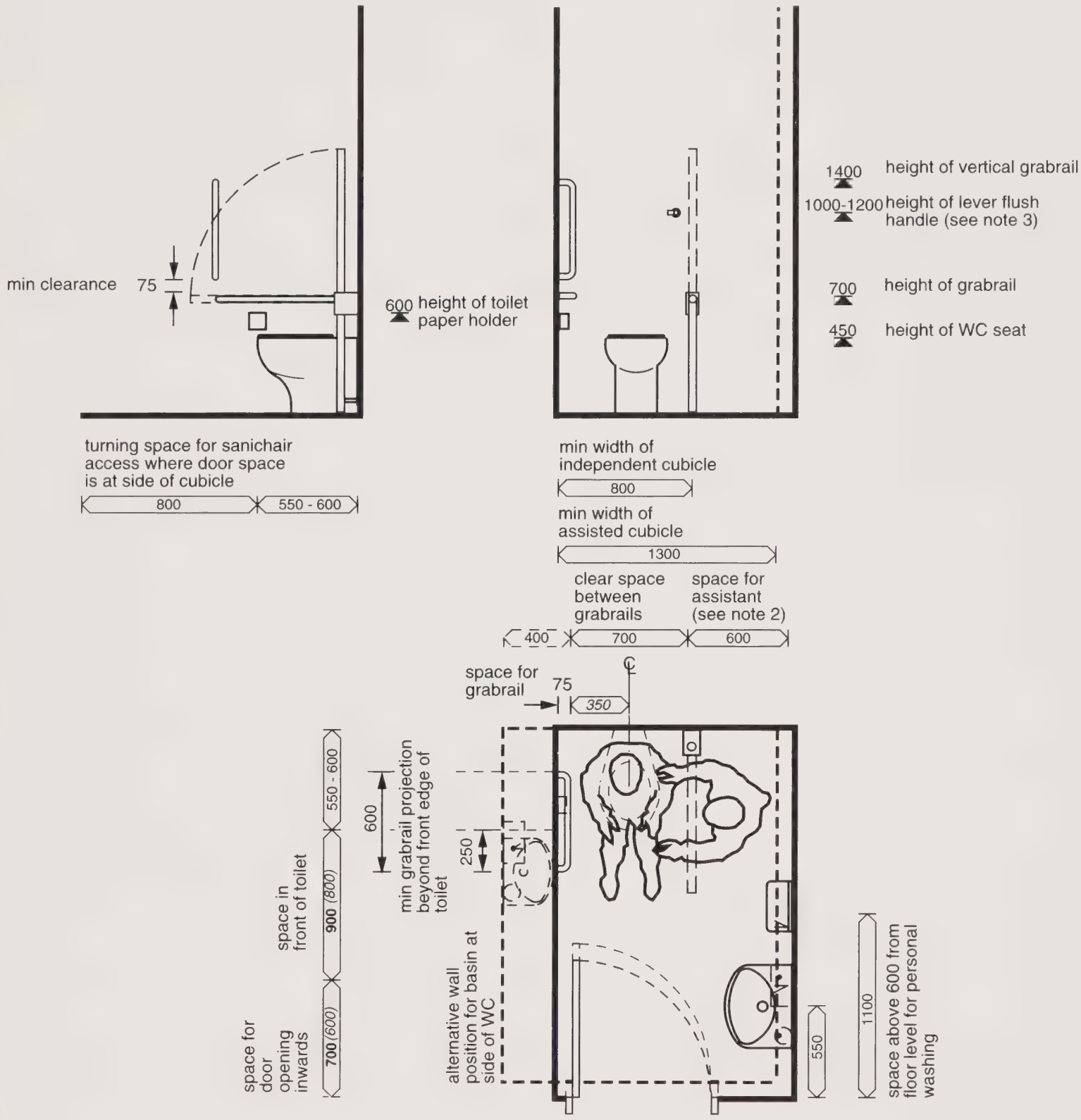
7. Side access to the WC for the assistant is generally preferred for semi-ambulant people. See Toilets 3.

Activities:
Use of WC and handrinse facilities with side access space for assistant.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Toilets 3

Users:
Ambulant, semi-ambulant, assisted or independent (also sanitary chair users)



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1. This layout allows space for entry with a child or bags etc. Where several unisex or ambulant WCs are provided they should be handed.

2. This allows side access when the hinged grabrail is in the raised position.

3. Flush handles below 1100 will obstruct positioning of a sanitary chair over the WC.

4. Floors should be slip resistant and in contrasting colour to the walls and WC. Floors should not be shiny or cause reflections or glare since this causes confusion for people with sight impairments. The colour or tone of the background should allow grabrails and sanitary fittings to be easily distinguished.

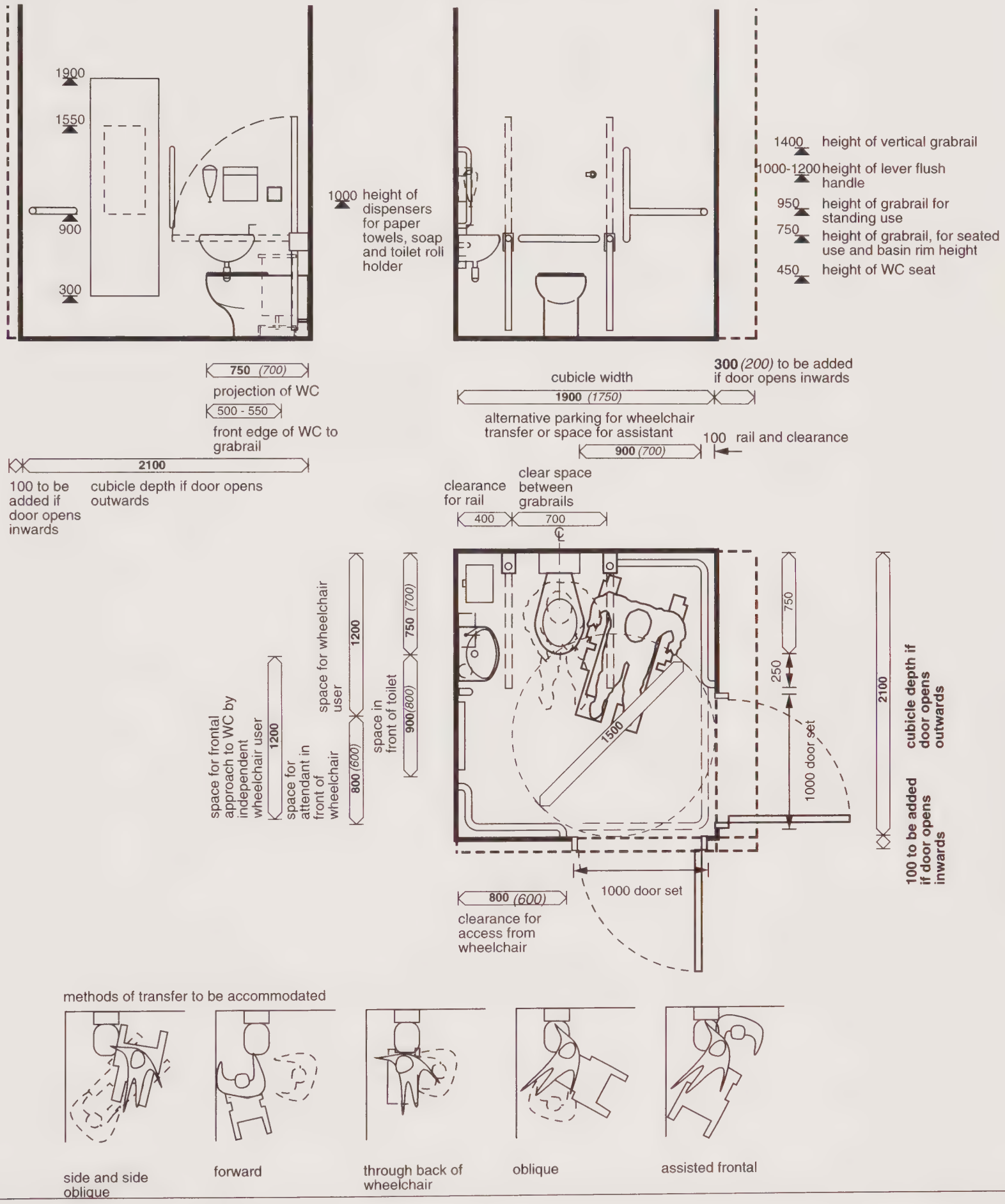
5. An alarm cord, reachable from the toilet/ basin and floor must be fitted.

Activities:
Use of WC and handrinse facilities for wheelchair users and semi-ambulant people. Toilet can also be used as a specimen WC.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Toilets 4

Users:
Independent wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes for Toilets 4, 5 & 6 on separate page.

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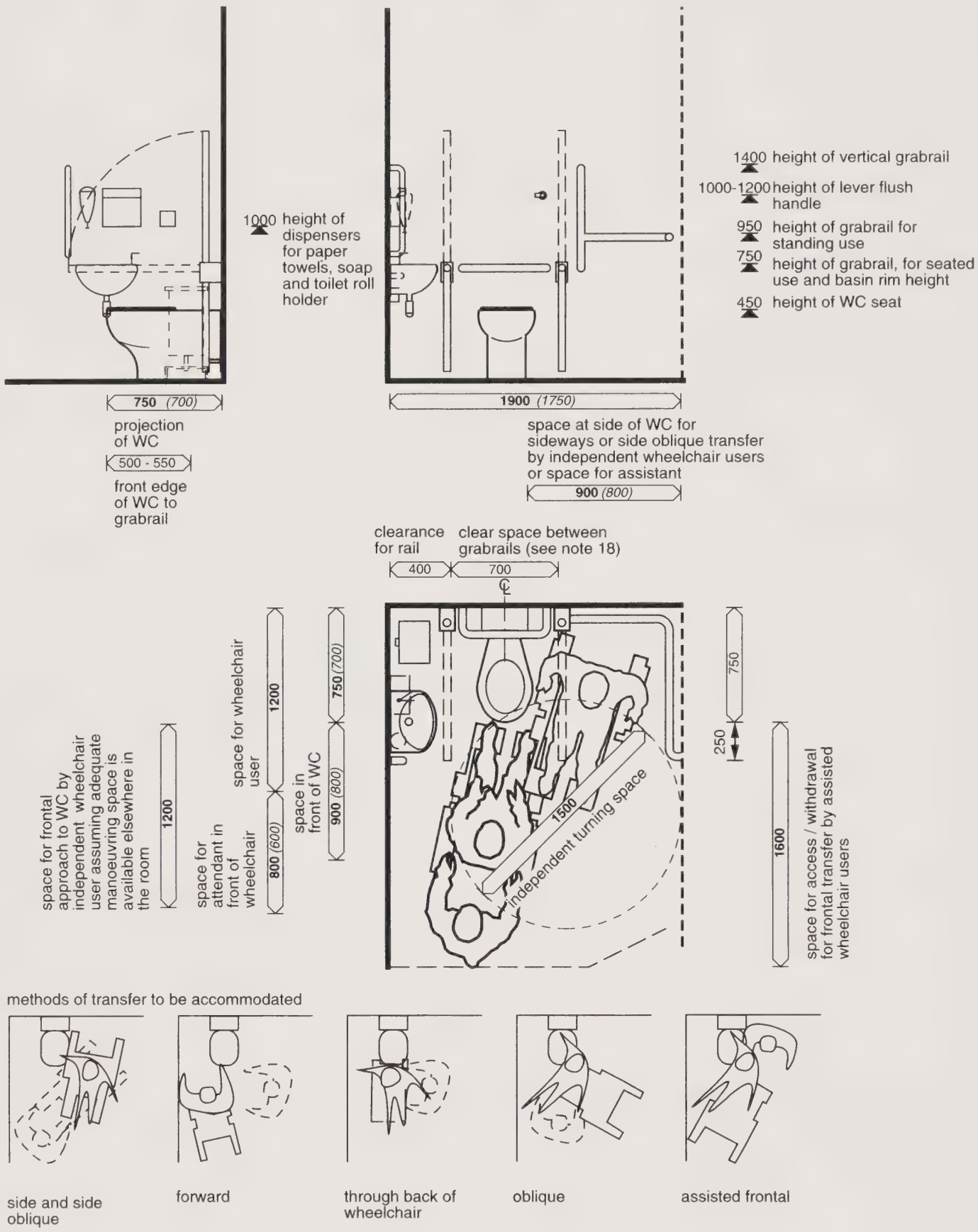
Activities:
Use of WC and handrinse facilities for wheelchair users and semi-ambulant people

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Toilets 5

Users:
Independent and assisted wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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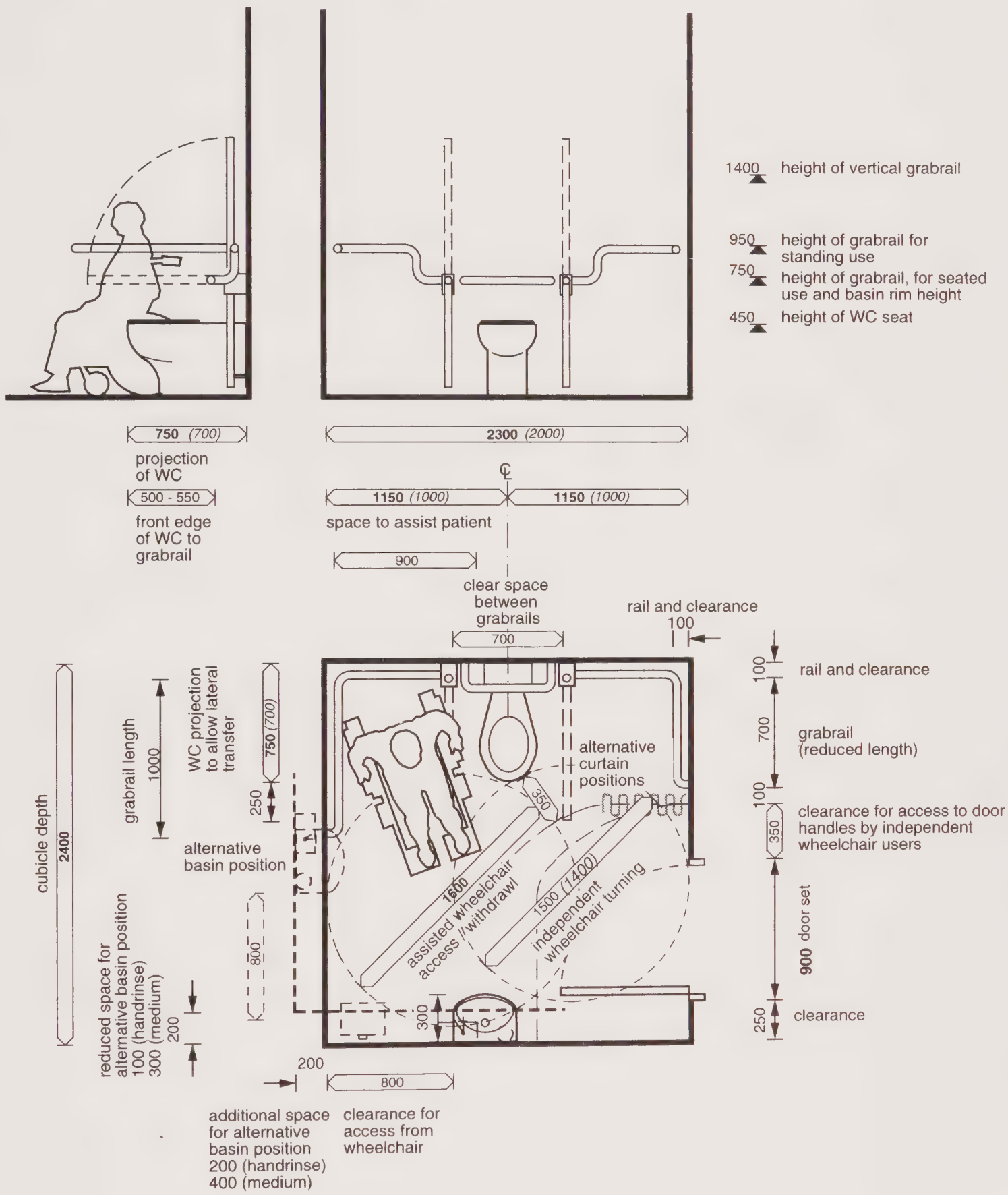
a. See notes for Toilets 4, 5 & 6 on separate page.

Activities:
Use of WC and handrinse facilities. Providing for lateral transfer from right or left to/from a wheelchair and allowing for full assistance by two persons standing either side of WC.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Toilets 6

Users:
Independent and dual assisted wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes for Toilets 4, 5 & 6 on separate page.

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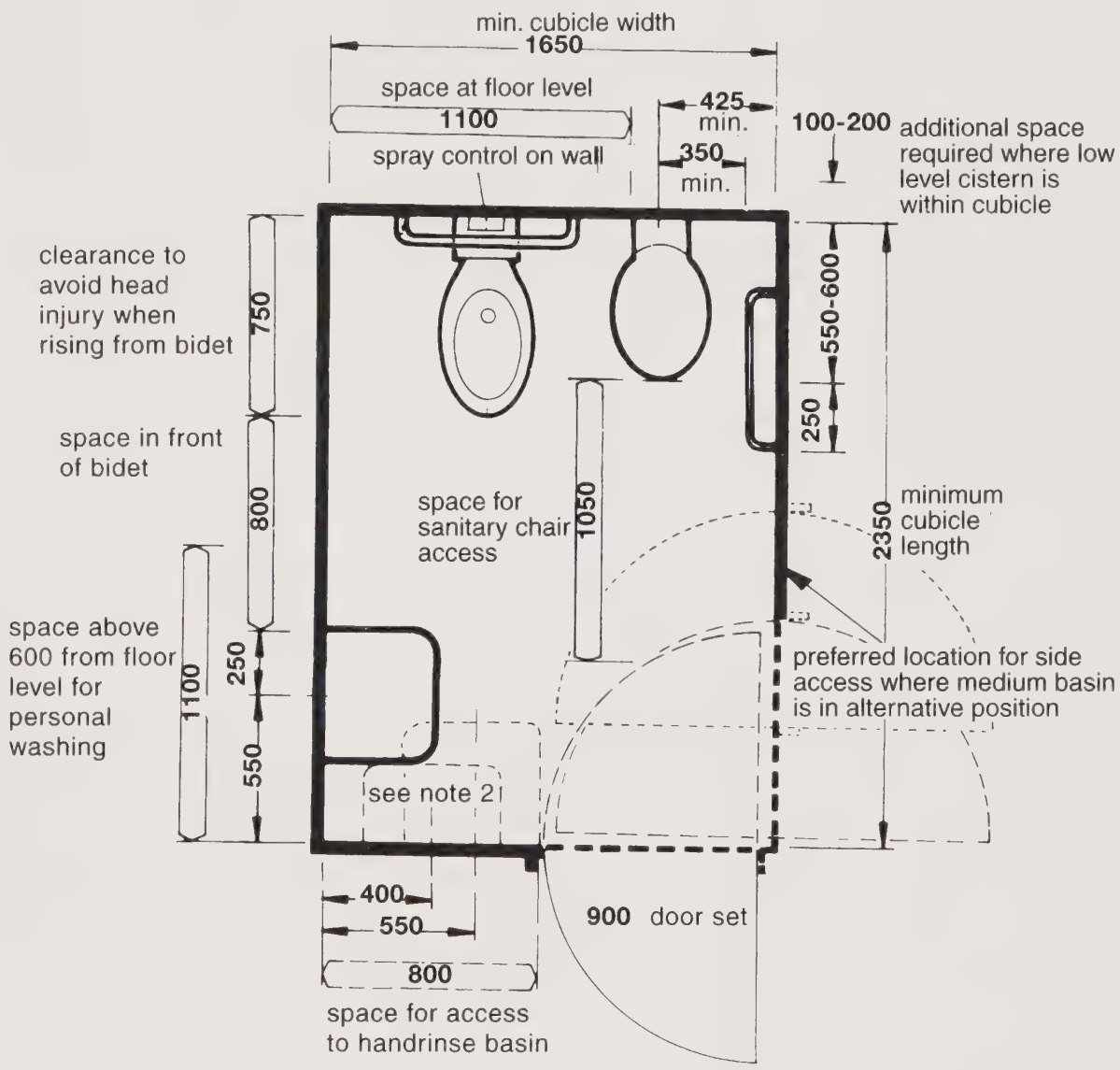
Activities:
Use of WC and bidet (where assistance is minimal) and sanitary chair access.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Toilets 7

WC with bidet and basin

Users:
Fully ambulant and semi-ambulant users



Notes:

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1. Where practicable doors should open outwards to give access to an occupied cubicle in an emergency.

2. Alternative position for hand rinse basin only (for medium basin where less satisfactory 800 door set is used) - when basins are in this position, cubicle length may be reduced to 2100 (medium basin) 1950 (handrinse basin).

6.7 Waiting/refreshment areas

In areas where patients sit for the purpose of waiting and/or to take refreshment, the type of chairs chosen should allow people with different needs to sit in comfort. In particular, older people, in addition to those with mobility problems and pregnant women, will require chairs with high seats, high backs and armrests to enable them to get into and out of them easily. Nursing mothers and those accompanying children may require chairs with low seats; other users may be accommodated on more basic types of chairs.

Chair coverings should provide comfort, but at the same time be easy to wipe clean.

In designing a waiting/refreshment area, it is sensible to avoid a layout which has chairs placed in rows or round the edges of walls, as this can make people feel uncomfortable and nervous; in these areas, it is best to arrange chairs in smaller groups instead.

It is necessary to provide adequate space for those using walking aids or wheelchairs, and those with pushchairs, to negotiate the spaces between chairs. Space will need to be allocated so that those in wheelchairs may sit alongside others.

In refreshment areas, wheelchair users will require sufficient space to comfortably access the refreshment dispensing machines, service counters and tables.

Furniture used in these areas should contrast in colour and tone to the floor surface, in order that visually-impaired people are able to identify the furniture and avoid any possible trip hazard. If possible, crockery should contrast in colour/tone with the table surface; this can be achieved by using dark or light tablecloths or placemats.

Waiting/refreshment areas should be adequately lit, not only in order to enable visually-impaired people to negotiate their way, but also to make the area feel bright and cheerful. All information signs and notices should be easily visible (further guidance is available in the 'Signposting' data sheets, and associated notes, earlier in this volume).

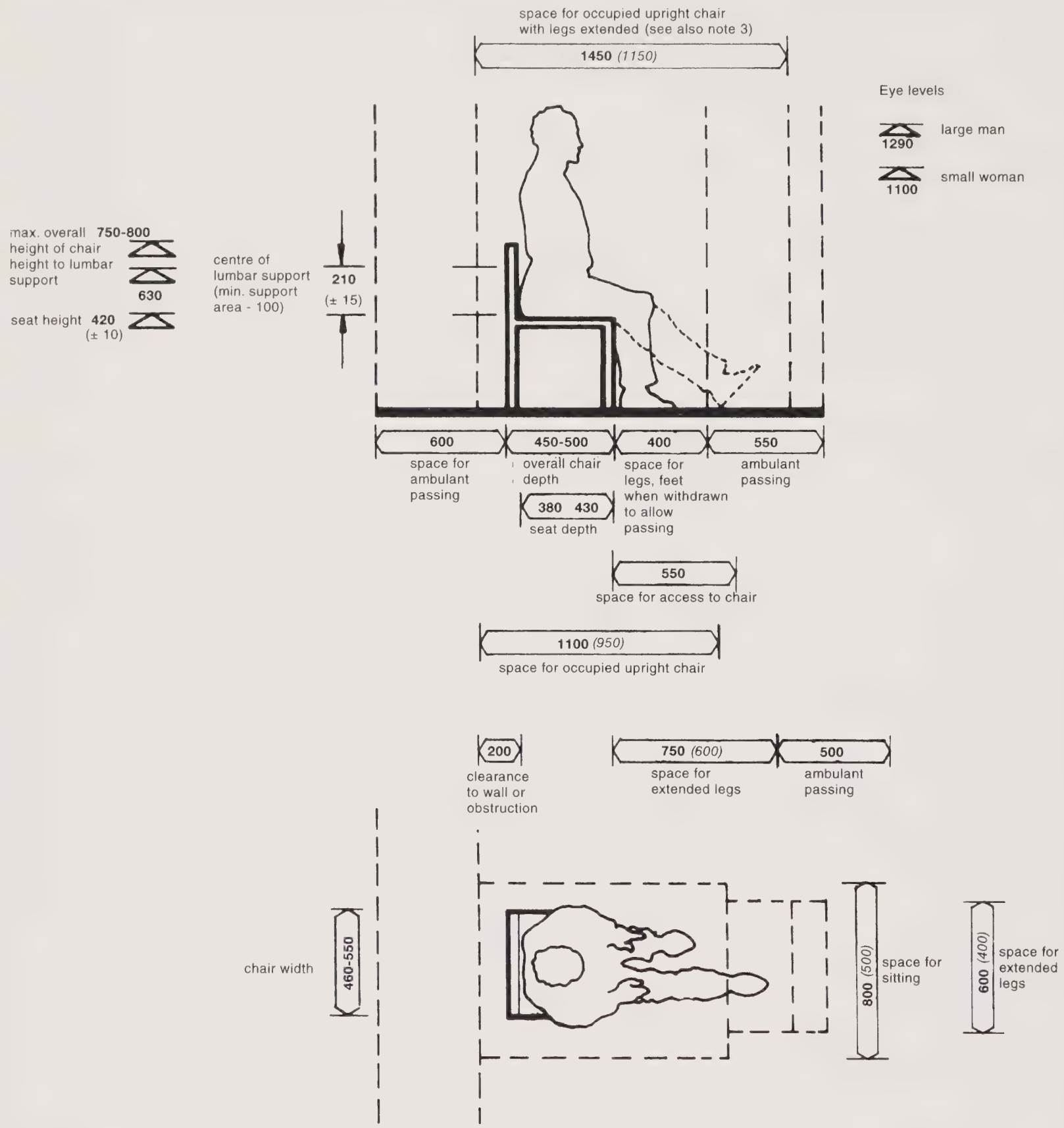
Activities:
Sitting in a chair.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Chair 1

Upright

Users:
Fully ambulant users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

© Crown Copyright

1. Maximum angle of seat plane 5° (3° preferred). The edge of the seat should be rounded.

2. Ergonomic objectives for chair:

a) Shod feet should be flat on the floor with no pressure at front of seat between seating surface and thighs.

b) Front edge of seat must not impose pressure on back of legs, i.e. seat length must be adequate but not too long.

c) The chair should provide a firm back support in the lumbar region but below the shoulder blades.

d) Preferably there should also be adequate clearance between the backrest and seat to allow free movement of the buttocks.

e) The space under the seat should be sufficient to allow the feet to be placed under the chair to assist the change from seated to standing position.

3. Space for occupied upright chair with legs extended should be 1450 *(1150)*. Restricted space for visitor, in front of table or desk 1150 but 1250 preferred.

4. See also BS 5940: Part 1: 1980.

Activities:
Sitting in chair, with assistance.

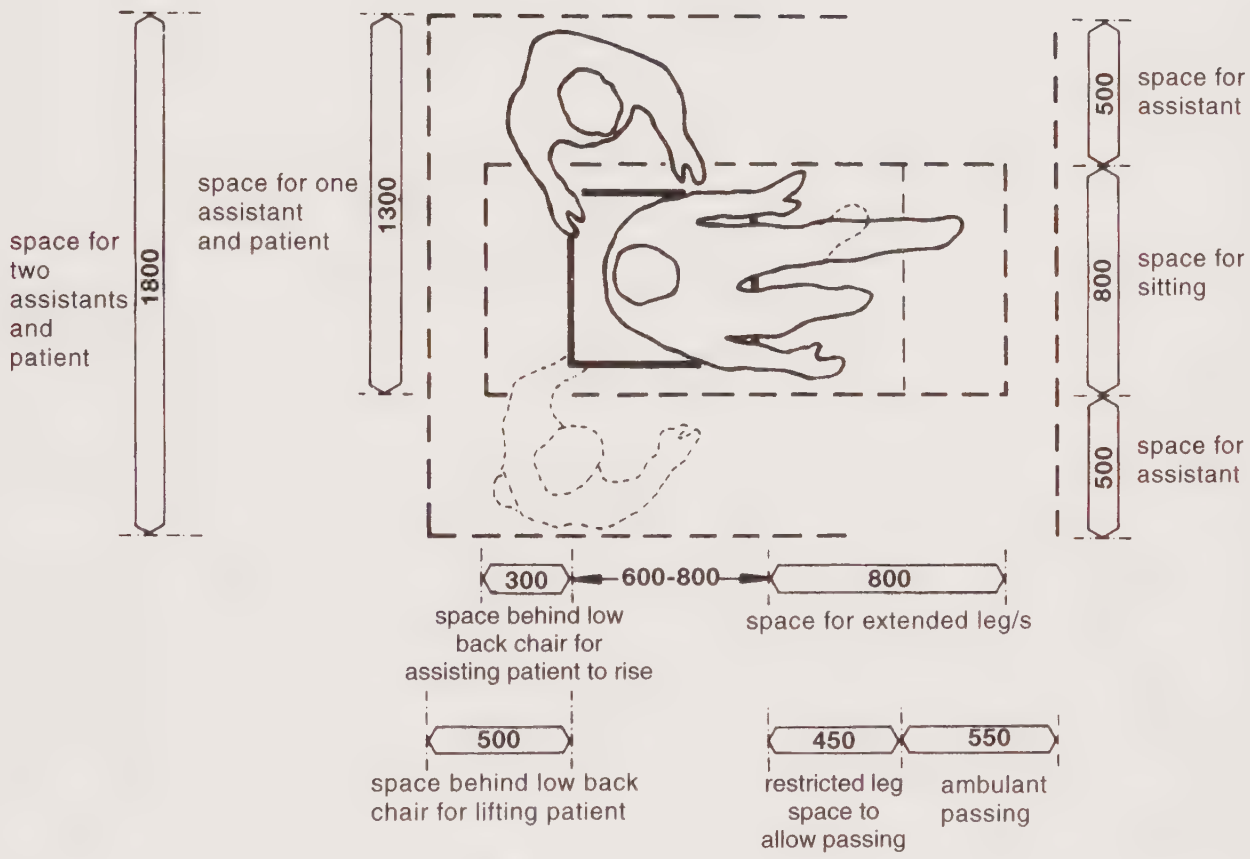
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Chair 2

High seat easy chair

Users:
Elderly, pregnant and semi ambulant

ELEVATION



PLAN

Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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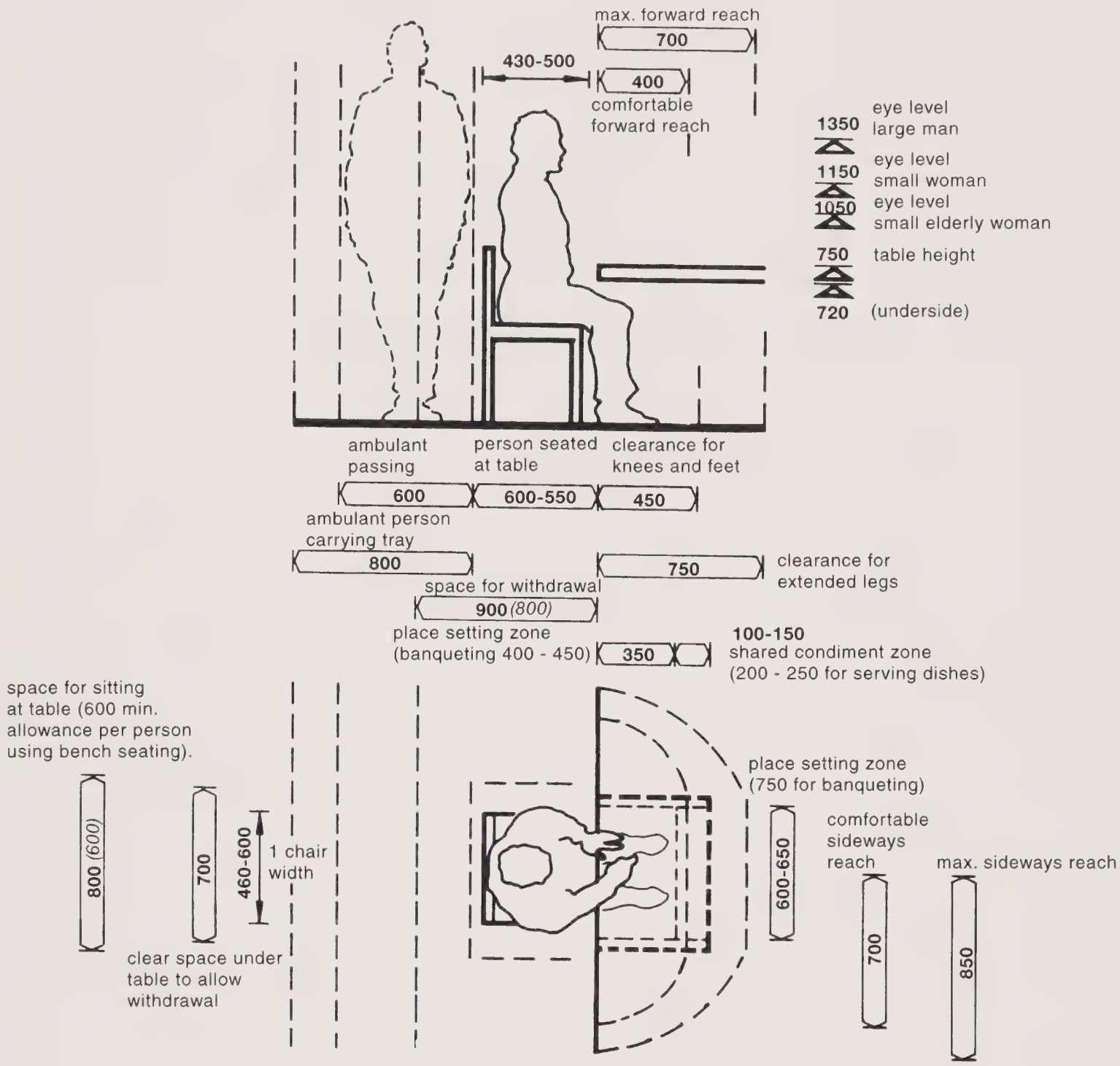
Activities:
Sitting and eating, including approach and withdrawal from table and service access.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 1

Dining

Users:
Fully ambulant users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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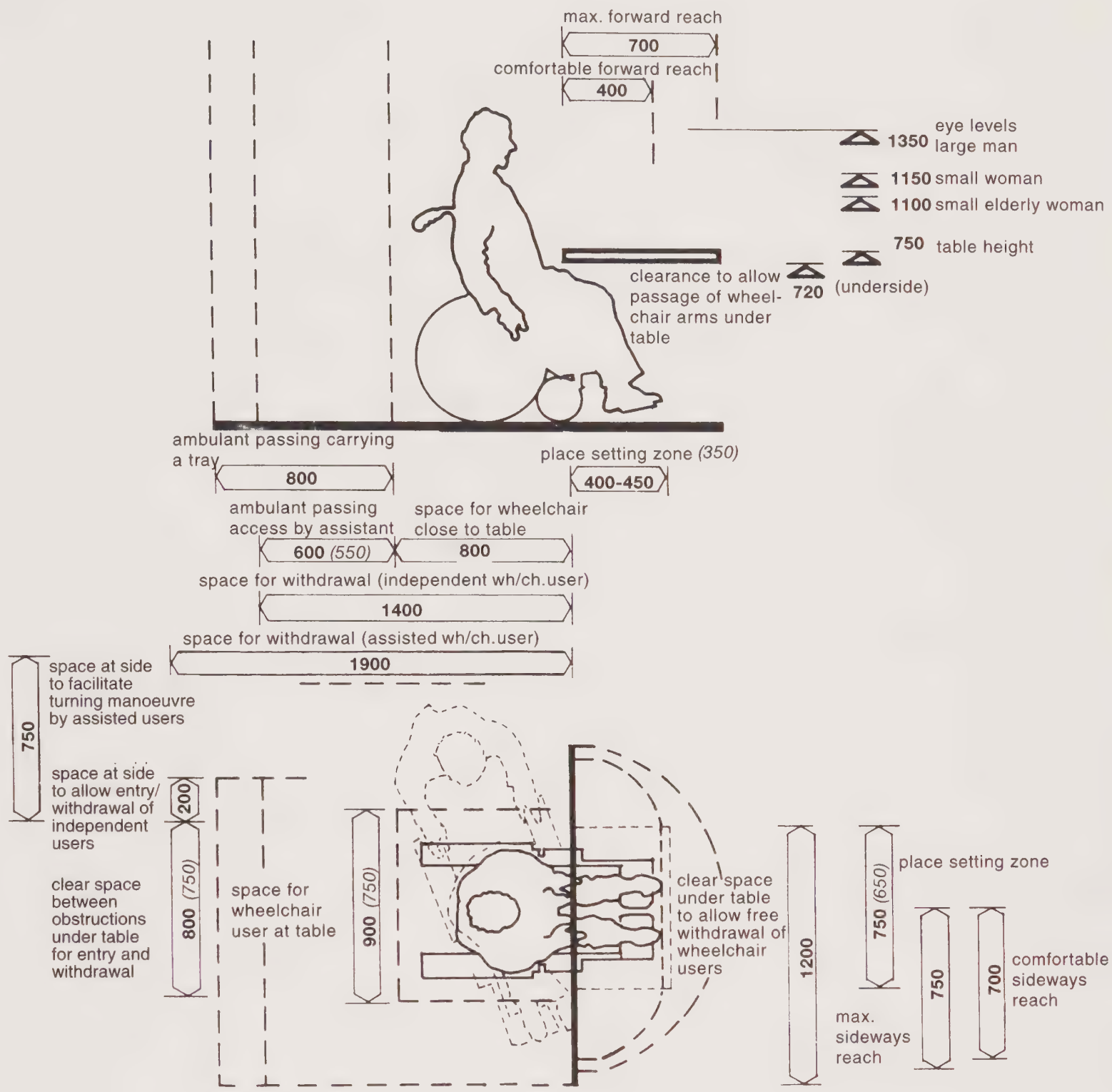
Activities:
Sitting and eating, including approach and withdrawal from table and service access.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 2
Dining

Users:
Independent and assisted wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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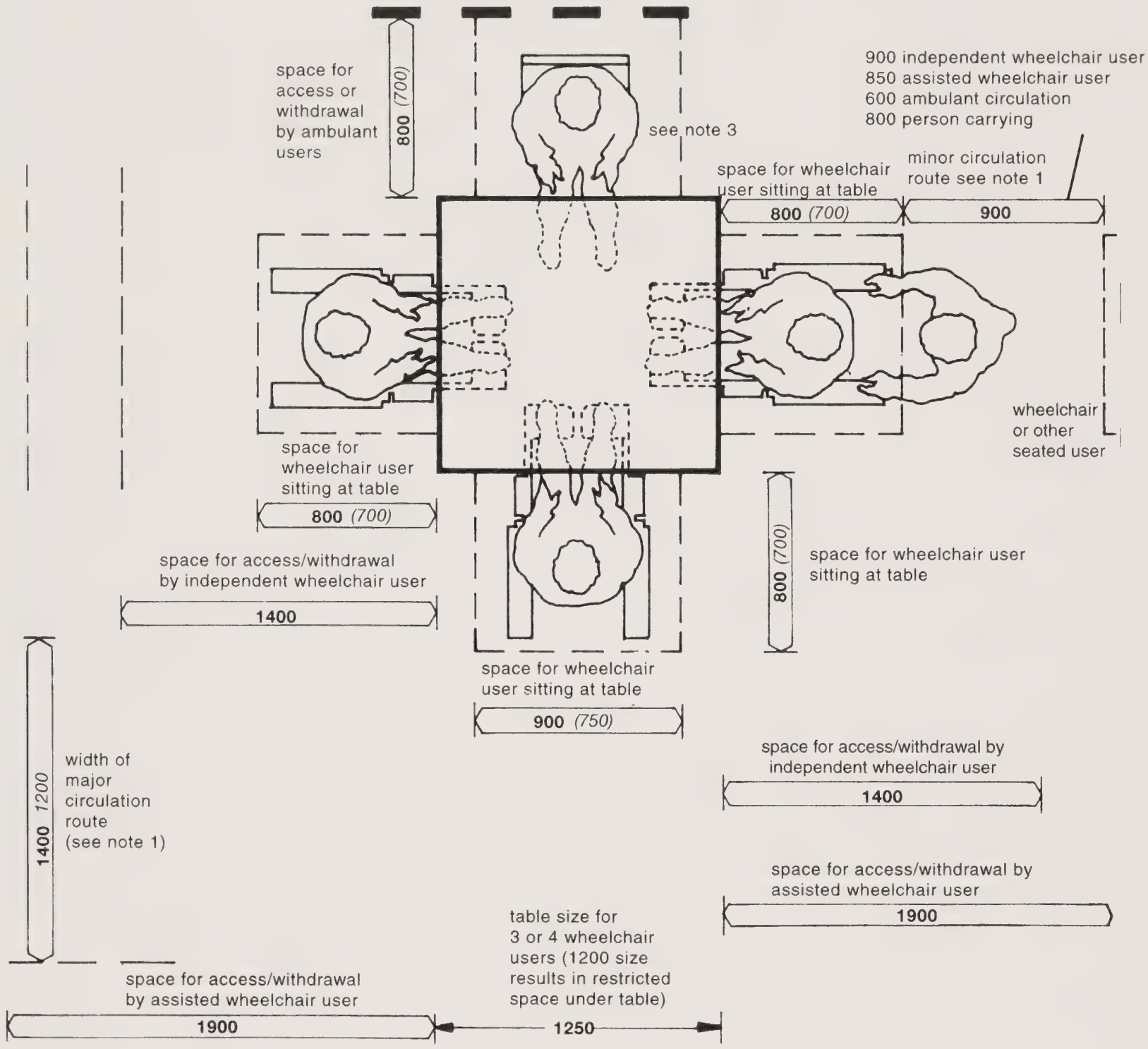
Activities:
Approach to and withdrawal from dining table.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 3

Dining (square)

Users:
Fully ambulant, assisted and independent and assisted wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. The width of major circulation routes is dependent on the traffic conditions i.e. number and frequency of wheelchair, trolley and ambulant persons using the route. e.g. where space for the frequent passing of 2 independent wheelchair users is required the width of the circulation route is 900+900 = 1800. The 1400 (1200) dimension given above relates to the minimum requirements of ambulant serving staff only.

2. It is not economical or convenient to position wheelchair users in positions backed by a wall. Therefore this position should be used by an ambulant person. Manoeuvring should preferably make use of space used generally for circulation.

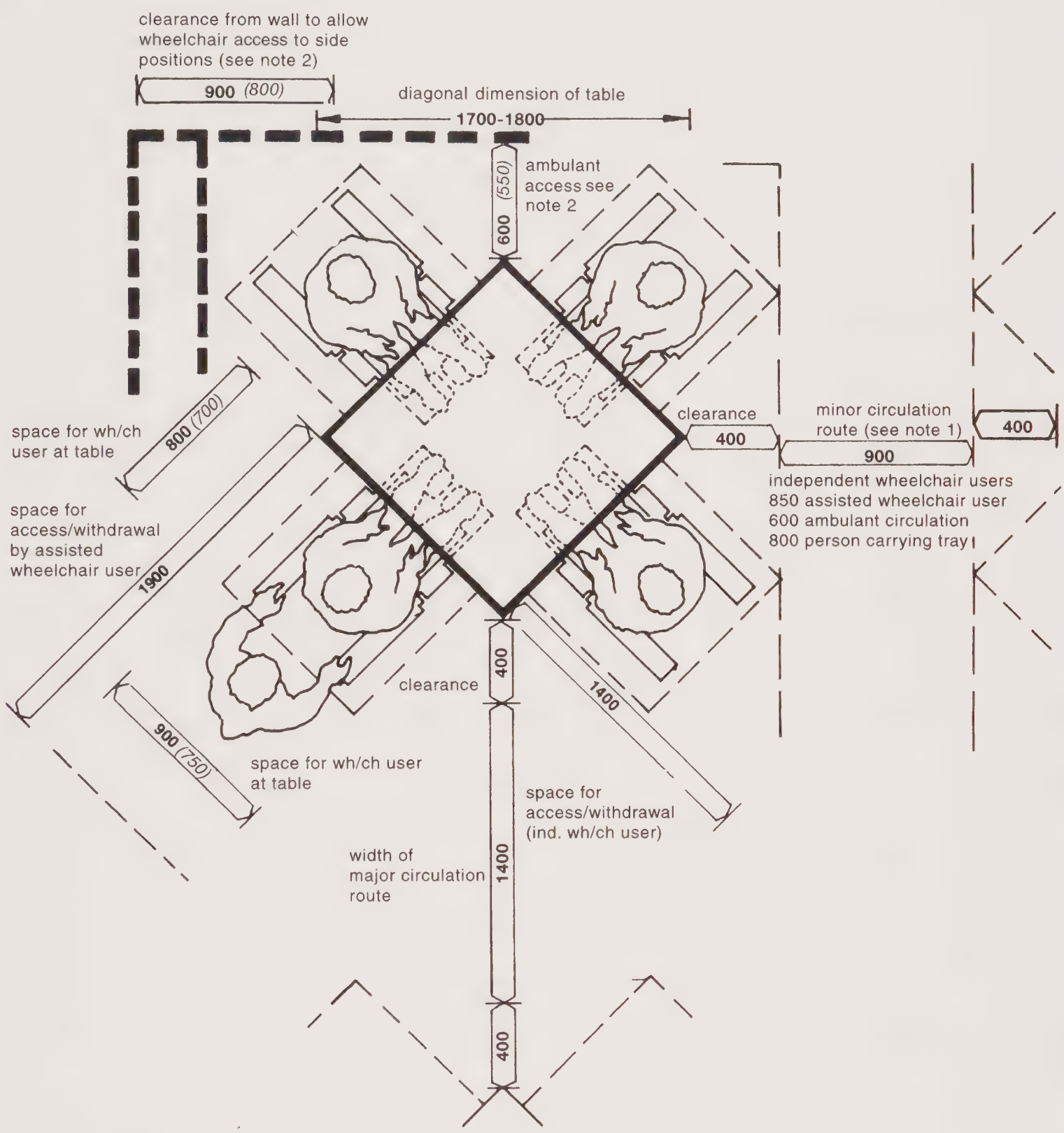
Activities:
Approach to and withdrawal from dining table

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 4

Dining (square)

Users:
Assisted and independent wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. The width of major circulation routes is dependent on the traffic conditions i.e. number and frequency of wheelchair, trolley and ambulant persons using the route. e.g. where space for the frequent passing of 2 independent wheelchair users is required the width of the circulation route is 900+900 = 1800. The 1400 (1200) dimension given above relates to the minimum requirements of ambulant serving staff only.

2. Where space to access side positions in a corner table accommodates wheelchair users then restricted manoeuvring space is available for an independent wheelchair user to access the corner position. However, this will be difficult and cannot therefore be recommended. Generally wheelchair tables should not be positioned in the corner of the room.

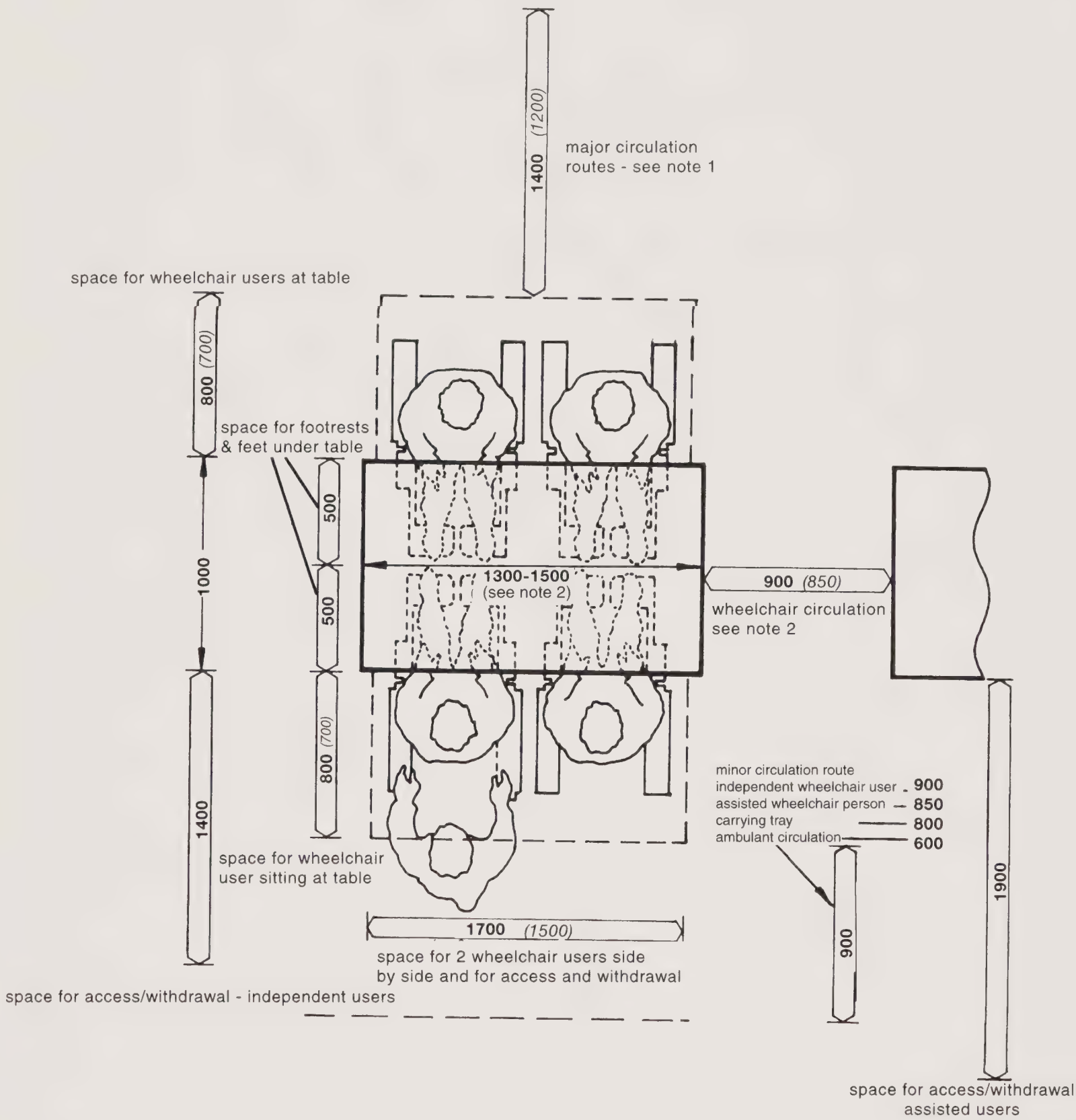
Activities:
Approach to and withdrawal from dining table.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 5

Dining (rectangular)

Users:
Assisted and independent wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. The width of major circulation routes is dependent on the traffic conditions i.e. number and frequency of wheelchair, trolley and ambulant persons using the route. e.g. where space for the frequent passing of 2 independent wheelchair users is required the width of the circulation route is 900+900 = 1800. The 1400 (1200) dimension given above relates to the minimum requirements of ambulant serving staff only.

2. 1000 (950) is preferred for frequent movement by independent wheelchair users between several tables in a large dining room.

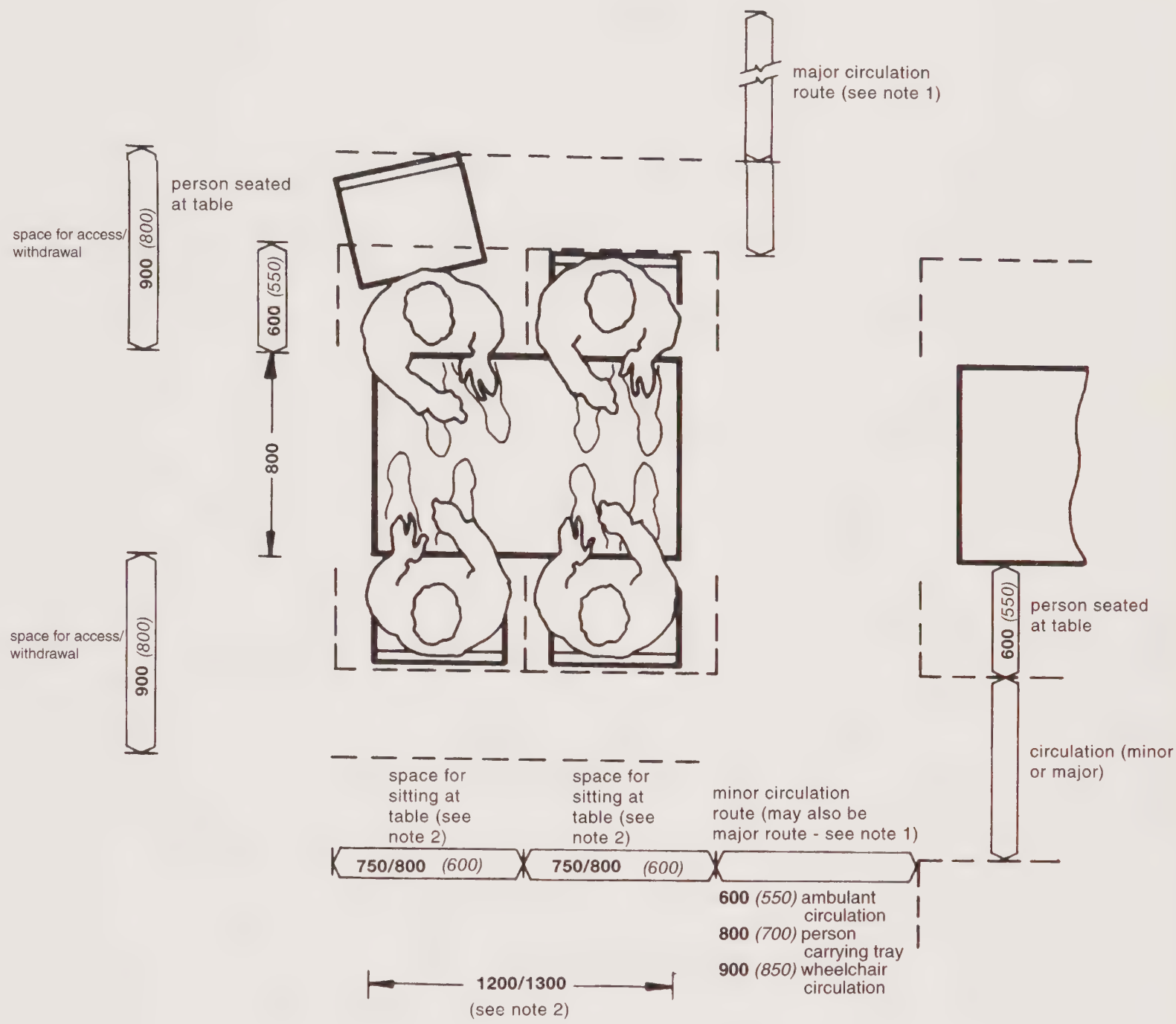
Activities:
Approach to and withdrawal from dining table.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 6

Dining (rectangular)

Users:
Fully ambulant and semi-ambulant adults



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. The width of major circulation routes is dependent on the traffic conditions i.e. number and frequency of wheelchair, trolley and ambulant persons using the route. e.g. where space for the frequent passing of 2 people carrying trays = 800+800= 1600. 1600 also allows infrequent passing of a wheelchair user and a person carrying a tray (e.g. 900+700 etc.) Width of minor routes is dependent on the number and frequency of people using the route and the possible need to move equipment. NB. the drawing above does not allow for circulation between two back to back users withdrawn from the table.

2. A reduction in width of space for a person sitting at a table from 800 to 750 is acceptable with a 1200mm wide table. The restricted dimension (600) is applicable where passing is infrequent. The larger table length of 1300 is preferred for debilitated or disabled users. The table width of 900mm is more satisfactory where wheelchair users have to be occasionally accommodated.

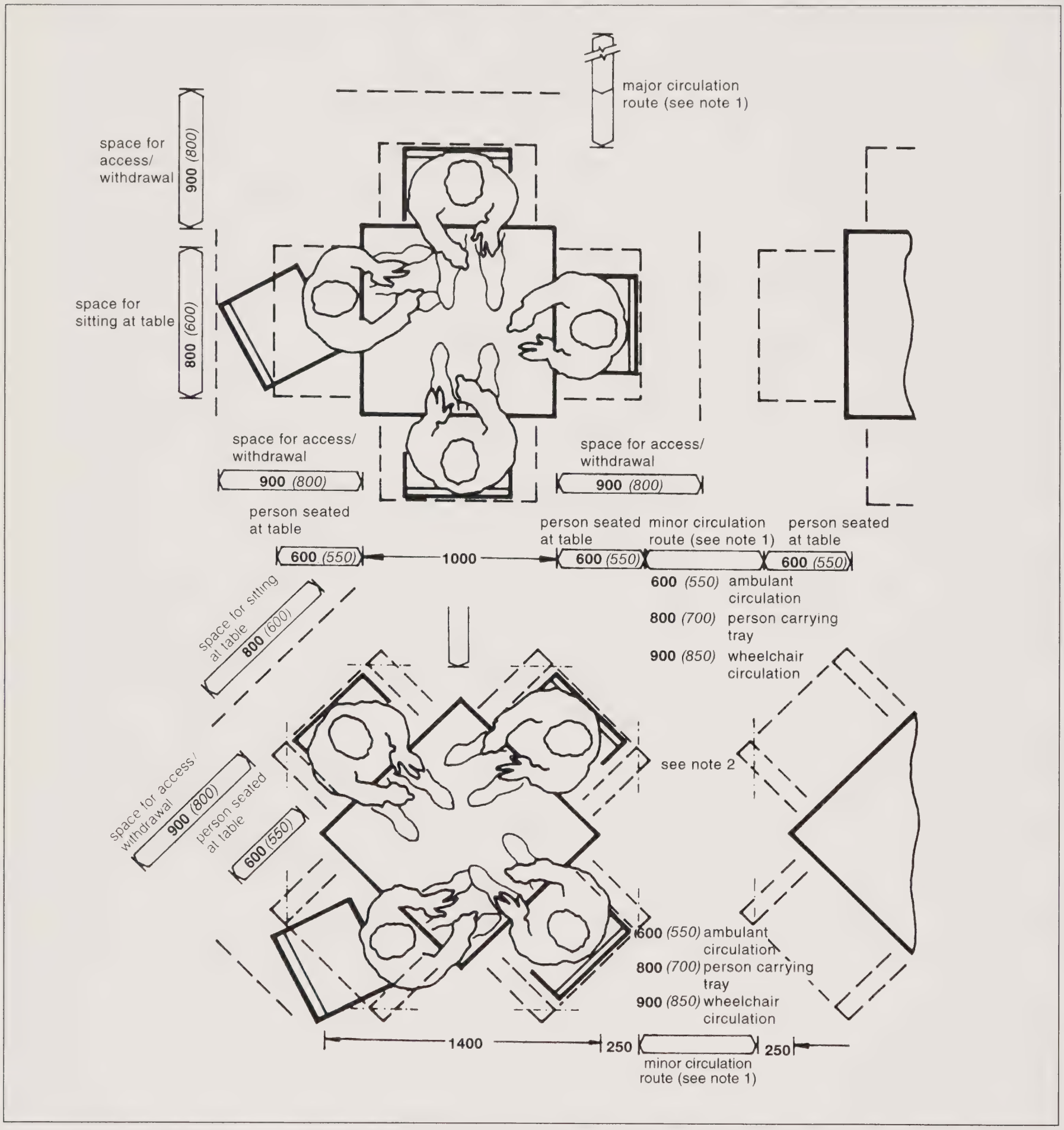
Activities:
Approach to and withdrawal from dining table.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 7

Dining (square)

Users:
Fully ambulant and semi-ambulant adults.



Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. The width of major circulation routes is dependent on the traffic conditions i.e. number and frequency of wheelchair, trolley and ambulant persons using the route. e.g. where space for the frequent passing of 2 people carrying trays = 800+800= 1600. 1600 also allows infrequent passing of a wheelchair user and a person carrying a tray (e.g. 900+700 etc.) Width of minor routes is dependent on the number and frequency of people using the route and the possible need to move equipment. NB. the drawings above do not allow for circulation between two back to back users withdrawn from the table.

2. As significant arm movements take place forward of the chair backrest, it is possible to overlap user space for diners and circulation space in an angled table arrangement. It is recommended therefore that the circulation widths relate to the restricted (600) width of space for diners.

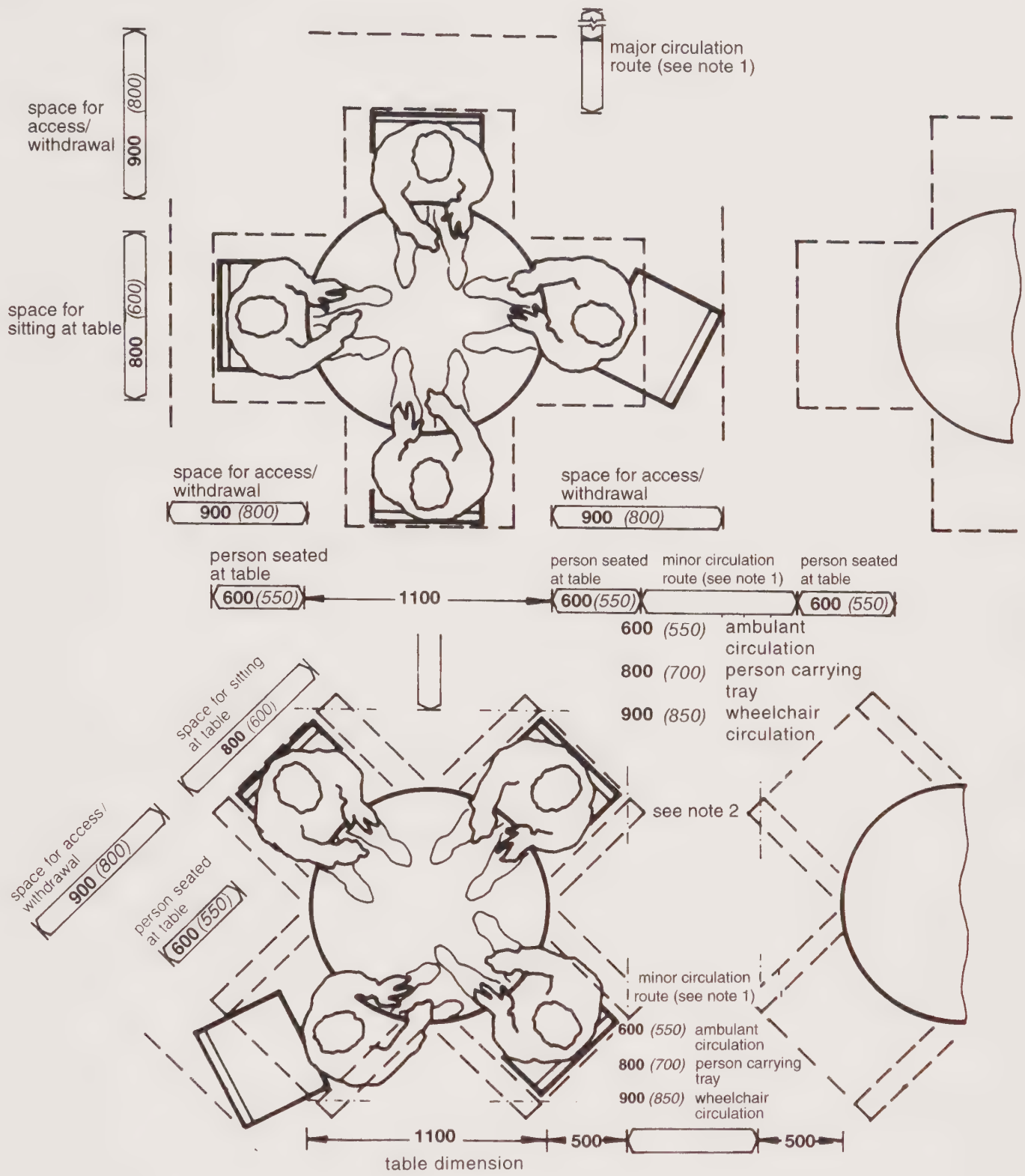
Activities:
Approach to and withdrawal from dining table.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Table 8

Dining (round)

Users:
Fully ambulant and semi-ambulant adults



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. The width of major circulation routes is dependent on the traffic conditions i.e. number and frequency of wheelchair, trolley and ambulant persons using the route. e.g. where space for the frequent passing of 2 people carrying trays = 800+800= 1600. 1600 also allows infrequent passing of a wheelchair user and a person carrying a tray (e.g. 900+700 etc.) Width of minor routes is dependent on the number and frequency of people using the route and the possible need to move equipment. NB. the drawings above do not allow for circulation between two back to back users withdrawn from the table.

2. As significant arm movements take place forward of the chair backrest, it is possible to overlap user space for diners and circulation space in an angled table arrangement. It is recommended therefore that the circulation widths relate to the restricted (600) width of space for diners.

6.8 Components

This section contains a selection of component-user data sheets relating to commonly occurring components. The data sheets give dimensional and other ergonomic information about the use of individual components.

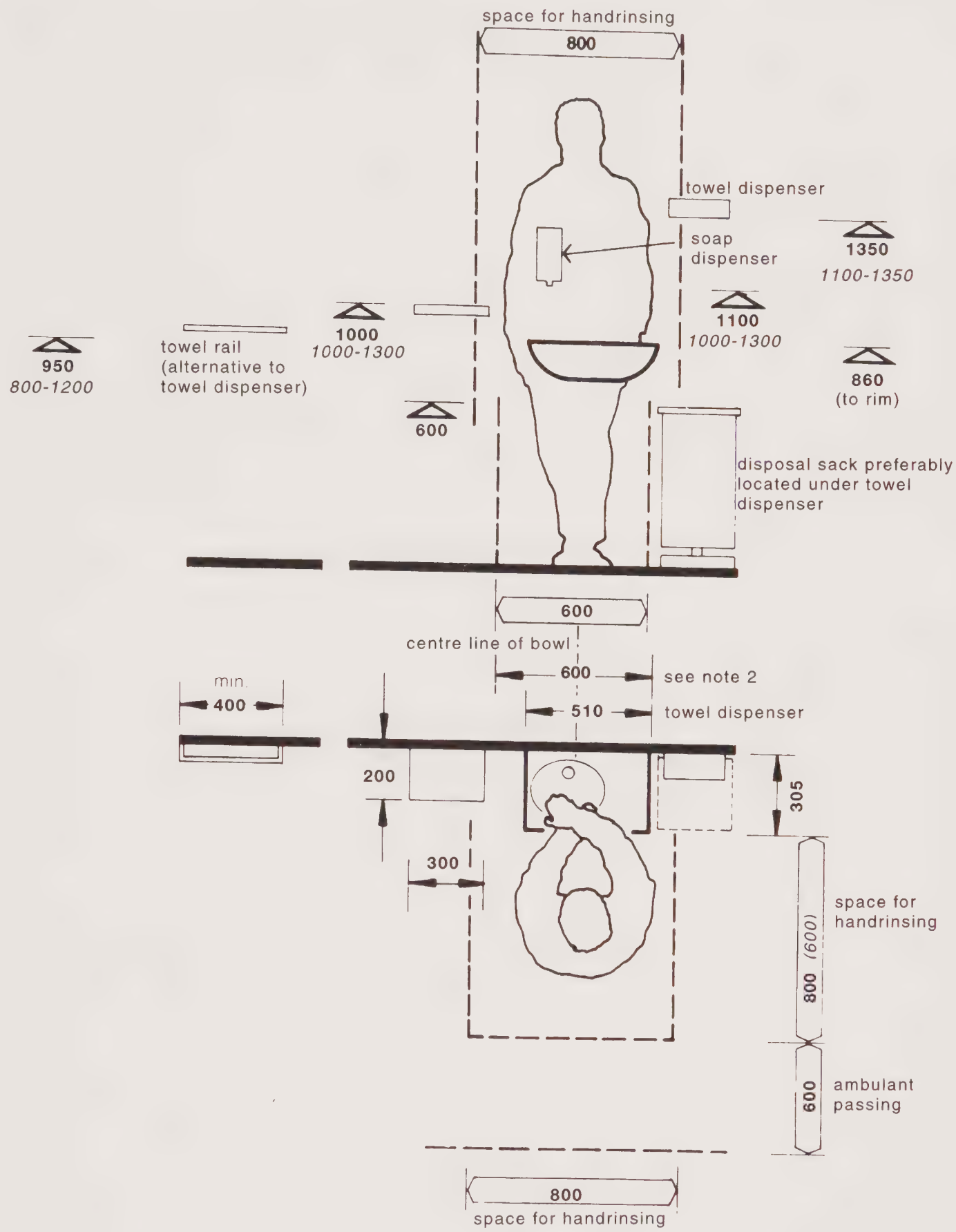
Activities:
Handrinsing

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Basin 1

Handrinse

Users:
Fully ambulant users



Notes:

1350 *(1300)*
Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Reach dimensions to secondary components.
Forward reach from edge of basin - 450 (comfortable) 750 (maximum)
Sideways reach from centre line of basin - 750 (comfortable) 850 (maximum)

2. To minimise possible injury to tall users when leaning forward over basin it is preferable that within this zone, the front edge of the basin projects at least 250 beyond any fitting located above the basin. Where the basin is recessed, the space from the front edge of the basin to the wall surface should be 250 (200).

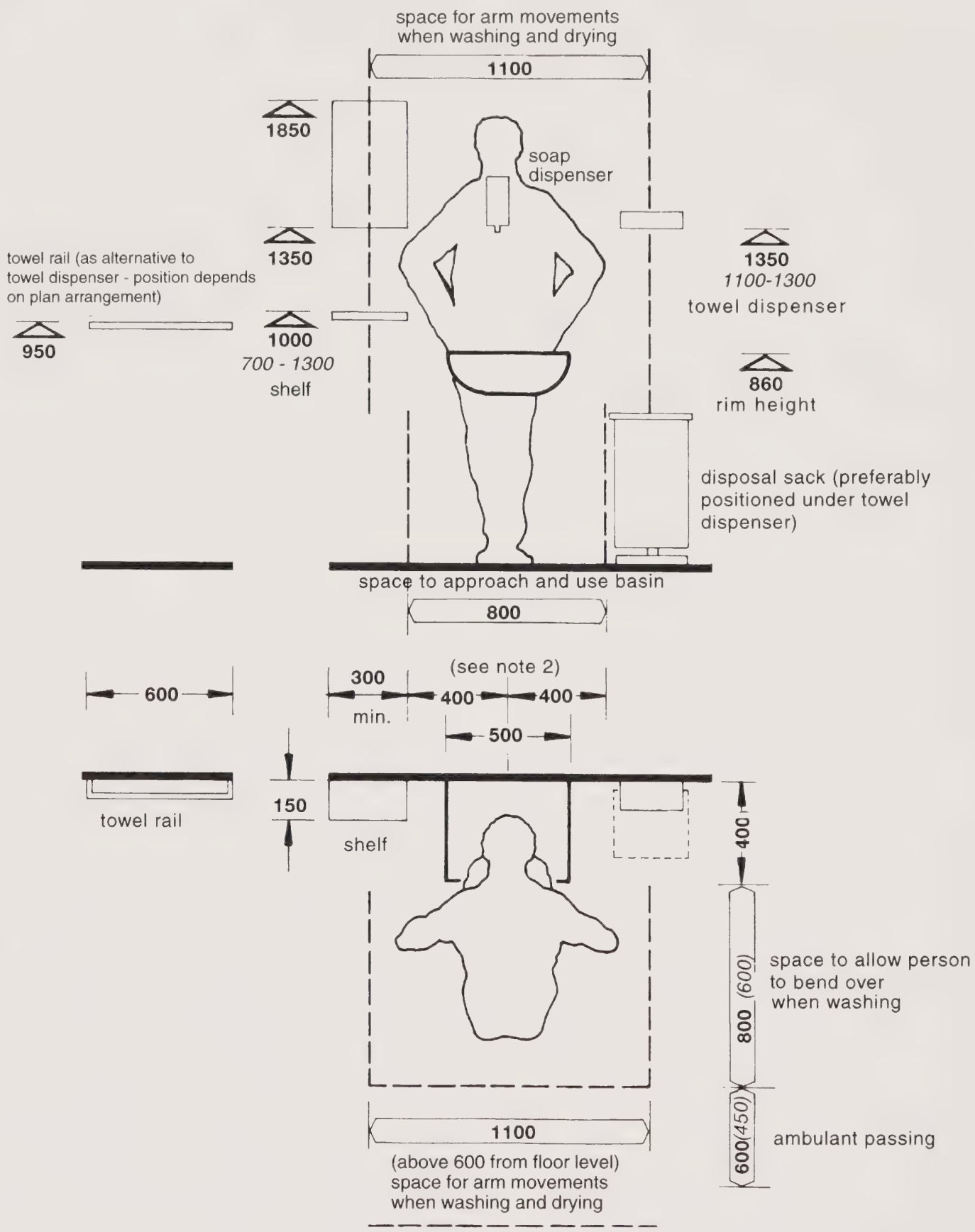
Activities:
Personal washing (hands, forearms, face etc.).

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Basin 2

Medium

Users:
Fully ambulant users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Reach dimensions to secondary components.
Forward reach from edge of basin - 450 (comfortable) 750 (maximum)
Sideways reach from centre line of basin - 750 (comfortable) 850 (maximum)

2. To minimise possible injury to tall users when leaning forward over basin care should be taken in locating any associated item over the basin, within the 800 wide zone shown, and up to a height of 1800 above floor level.

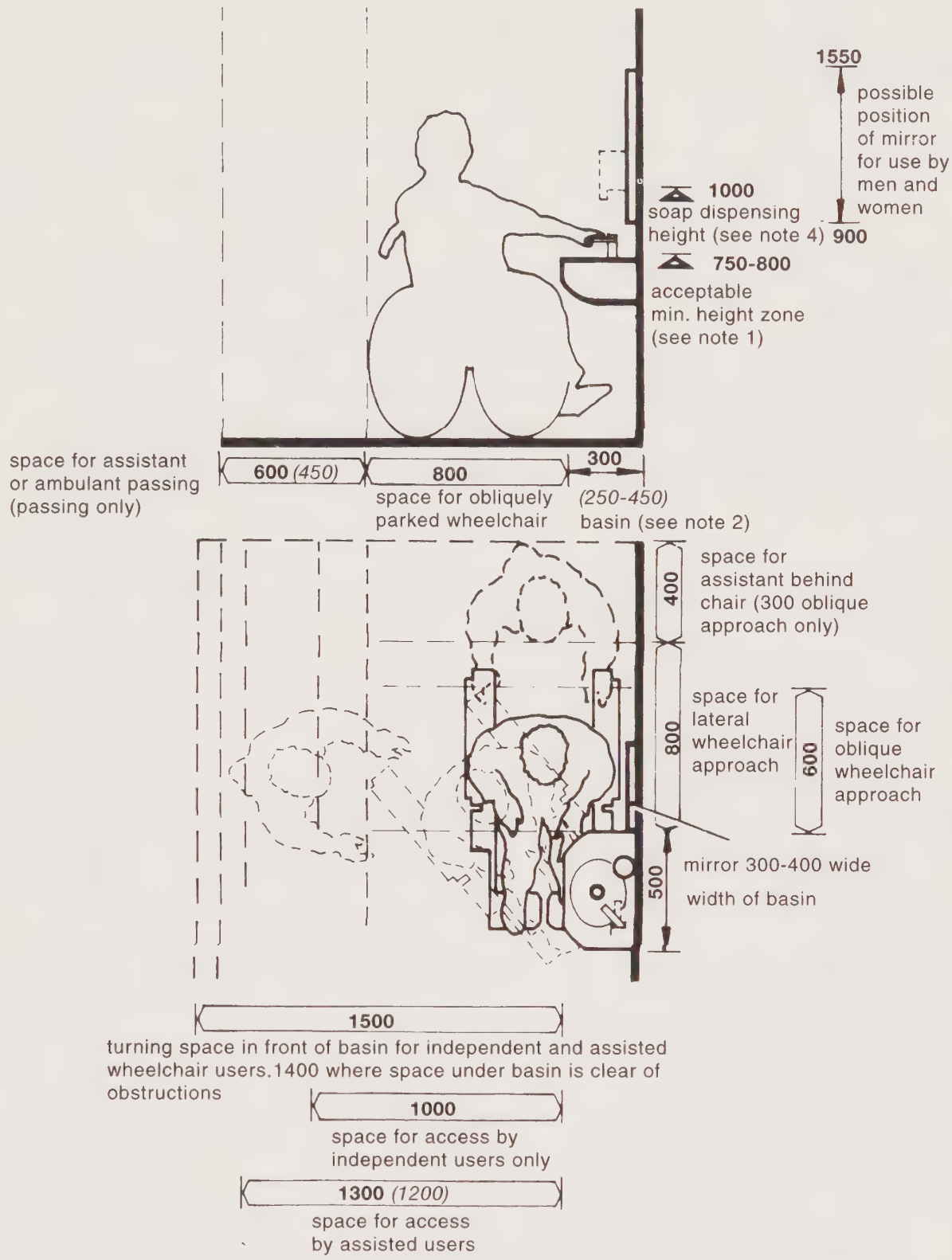
Activities:
Handrinsing.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Basin 3

Handrinse

Users:
Assisted and independent wheelchair users



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Rim heights between 700-750 would be preferable, but as basin profiles obstruct user access, it is essential to increase the rim height to provide knee space under the basin. The increase should be kept to a minimum. Rim heights over 800mm are unsatisfactory for small users.

2. Handrinse basin dimensions vary (250-450). Basins which project less than 300mm tend to be unsatisfactory in use, in that they do not adequately contain splashing. (This is a particularly critical requirement for seated users). For this reason recessed basins, because they tend to be very shallow, are not favoured. Additionally, they restrict access and movement of hands, which is unsatisfactory for disabled users and the wall into which they are built prevents approach for comfortable reach of the bowl area.

3. Lever action taps are preferred for independent users.

4. Soap dispensers, and towel dispensers where provided, must not be positioned over the tap where dispensing action will be impeded.

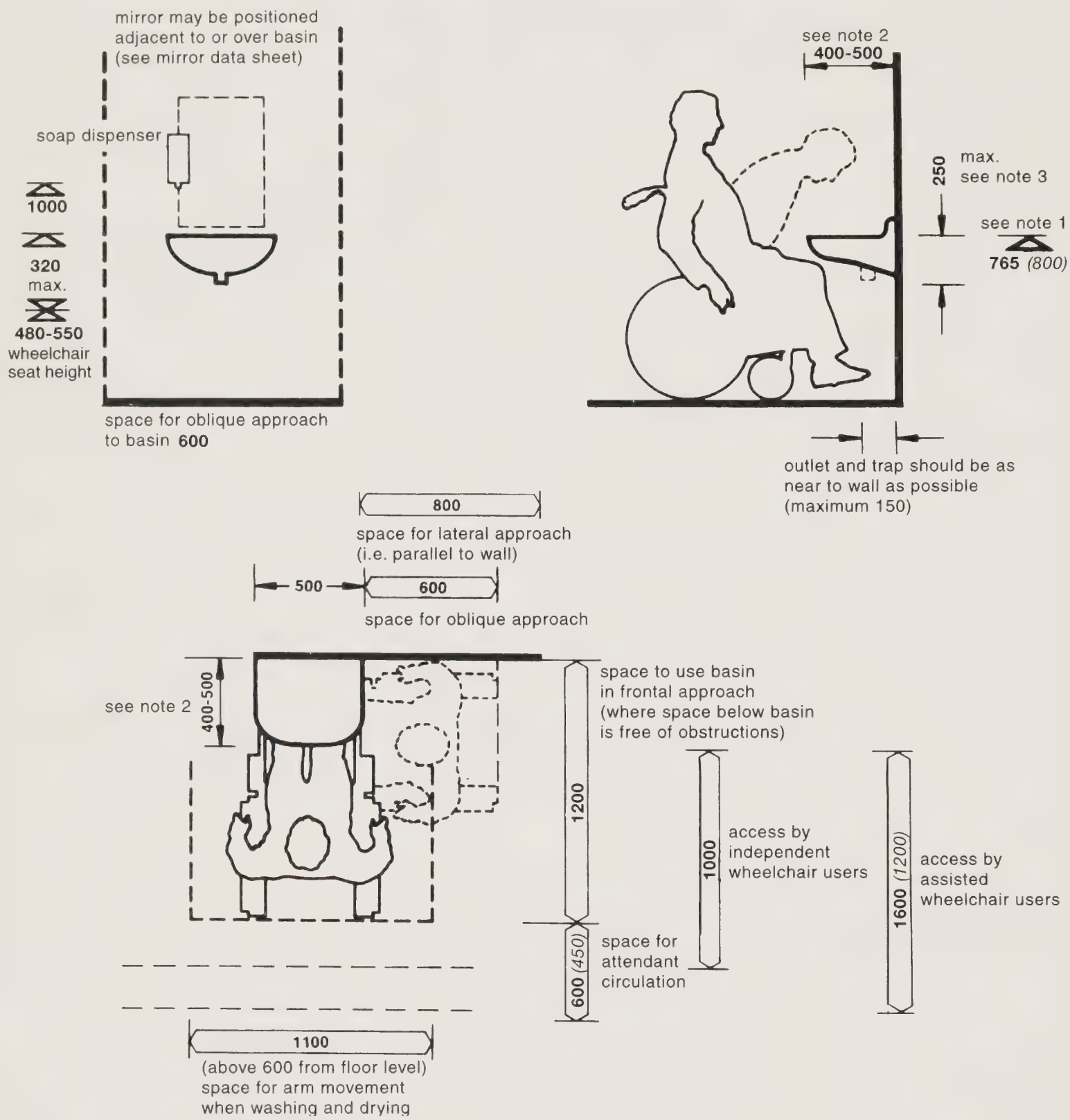
Activities:
Personal washing, hands, forearms, face etc.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Basin 4

Medium

Users:
Independent and assisted wheelchair users (also seated users)



Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Basin rim height - 765mm above floor level is recommended. This is slightly higher than ideal for normally seated users, but is necessary to accommodate the higher seat height of wheelchairs (480-550 as opposed to 430-440 for normal upright chairs). Deep cushions are frequently used giving seat heights of 520-550.

2. For personal washing activities by wheelchair users a basin projecting 500mm is preferred to provide adequate leg room under the basin in frontal approach. A depth of 500mm is essential for such activities as hair washing and face washing (maximum basin projection 700mm).

3. Care must be taken in the selection of basins for wheelchair or other seated users. Despite the need for relatively large cantilever projection, it is essential that the basin profile be as shallow as possible, i.e. it should be tapered from the rim to a depth preferably not exceeding 250mm (max.) at the outlet, which in turn should be positioned as near the supporting wall as possible.

4. See HTM 64.

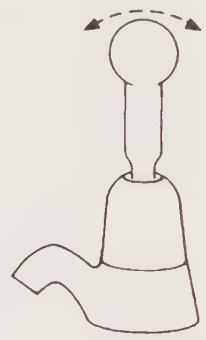
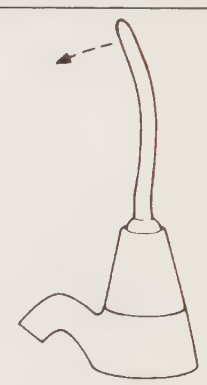
Activities:
Turning taps on and off.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Taps 1

Basin

Users:
People with impaired hand function

	SCREW DOWN		CROSS HEAD	
	DOME HEAD	TOGGLE ACTION BALL HEAD	EXTENDED	LEVER/ KNOCK ON/ OFF
POSSIBLE GROUPS OF USERS	Persons who have strong hands and good control + moderate grip strength.	Persons who have strong arms and hands (1. Where design is smooth or only slightly serrated, good grip strength is essential. 2. Broader heads, large domed surfaces, can be used by persons who cannot grip using palm of hand with wrist and arm movements only).	Persons who have arthritic hands or very poor co-ordination i.e. suitable for people not able to grip well but who have moderate strength and sufficient co-ordination to hold lever down largely using natural weight of arm.	Persons who can move arms, (but not necessarily hands) and have moderate strength and co-ordination to hold lever down as required.
RECOMMENDATIONS OF USE	Should generally only be used where user population have no manual disabilities or infirmity. Not recommended for use by the elderly.		For use where a large percentage of users are old, arthritic, or have generally poor co-ordination.	
MECHANISMS	Not self-closing (non concussive) thread which is screwed down when tap is in off position, screwed up when tap is open.		Can be either self-closing or not. Concussive valves tend to be difficult to control manually and water is consequently delivered in surges, which can be dangerous. Non concussive valves are therefore preferred.	
OTHER NOTES	1. Where screw taps are used, the head should provide a secure grip, thus cross head is preferred to dome head. 2. In both cases if a plastic thread is used as opposed to metal, friction is reduced and the tap is easier to turn. 3. See also adapter (cross head tap spanner). 4. Can also be fitted as remote taps, e.g. under or at front of worktop.		1. Very easy to use, but must be held in position to maintain waterflow. 2. Large ball heads (30-50mm diameter) are comfortable to use. 3. Toggle action valves should preferably have insulated handles.	

Maximum temperature as on all taps should be controlled by a thermostat, since people with impaired hand function often have sensory impairments or cannot react and move quickly enough to prevent scalding.

DIMENSIONS (mm) Total height above basin surface	100-110	100		155	220
Distance from centre of tap to water source	75	75		75	75

Notes:

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Tap controls must be positioned so as to be accessible to the wheelchair user and be within range of comfortable reach. Adjacent floor space should if possible afford both forward and parallel approaches.

2. For wheelchair or seated use tap controls must be within the range of 60-1150 (restricted operation - 500-1250 where approach is unobstructed). Preferred height 850-900 depending upon type of operating mechanism.

3. Taps must be operable with one hand and should preferably not require tight grasp, a pinching action or excessive twisting of the wrist for satisfactory operation by a person who is manually handicapped. The force required should not exceed 22N (5lb/ft).

4. Owing to the very considerable variability of manual handicap among disabled people there is no single tap design which will always be satisfactory. Characteristic groups will often require individual consideration.

5. For persons with weak or arthritic hands, conventional screw-down taps are difficult to use. Spring-loaded self-closing taps, which need to be pushed down and held down for operation should not be fitted where there are disabled or debilitated users.

6. The temperature of water drawn from hot water sources used by elderly or disabled persons must be thermostatically controlled. Sensory impairment causes a high risk of injury by scalding. Manual mixing valves are not recommended, as the temperature can fluctuate rapidly due to unequal pressures in the hot and cold water supplies.

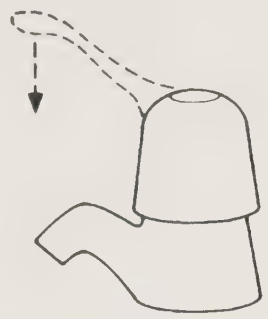
Activities:
Turning taps on and off.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Taps 2

Basin

Users:
People with impaired hand function



Single Tap Short Lever Tap Mixer tap with 2 levers

	SPRING LOADED (PUSH DOWN) (Not Recommended)	LEVER ACTION		
		SINGLE ACTION LEVER	DUAL ACTION LEVER	1/4 TURN
POSSIBLE GROUPS OF USERS	Only suitable for persons who have strong wrists, hands and arms, and have co-ordination to hold tap down during operation.	Persons who have poor grip and a weak or poor wrist movement.		
RECOMMENDATIONS OF USE	Should only be used where user population is fit and not old and as a second choice to screw down taps. (Not recommended).	For use where a proportion of users are old, arthritic, have weak hands and wrists etc.		
MECHANISMS	Spring loaded taps are self closing and work by pressure on top forcing valve down and open. They normally require a great deal of force to stay open and are therefore unsuitable for debilitated persons.	Separate taps are required for hot and cold water supplies (they may be fed into basin through two taps or a mixer). Temperature of hot water is regulated by a thermostat. Lever only alters flow of water. Not self closing.	One tap carrying both hot and cold water. Movement of lever is in two directions e.g. vertically and horizontally to control on/off and temperature (maximum temperature should be regulated by a thermostat). Not self closing.	Separate taps are required for hot and cold water supplies, but movement of lever between off and full is through 90° max. (60° - 70° pref.). The seal off is applied pressure and the spindle does not revolve. Not self closing.
OTHER NOTES	1. Some push-down taps have levers which make operation easier, since the operating force required is decreased. However, this still remains excessive for persons with very weak hands.	1. Facilities used for personal washing should not have long lever arms forward when in the open position, as this impedes access to the sink or basin and is potentially hazardous when users lean forward. The positioning of taps should be carefully considered as access to soap dispensers etc. can be obstructed. The storage of items behind taps of this design is generally not recommended. 2. A valve where the return of the lever is retarded to avoid concussion is preferred. 3. Lever controls may be remote controls (see Taps 3).		

Maximum temperature as on all taps should be controlled by a thermostat, since people with impaired hand function often have sensory impairments or cannot react and move quickly enough to prevent scalding.

DIMENSIONS (mm) Total height above basin surface	50	200mm (single)	200mm (single)	200mm (average)
Distance from centre of tap to water source	75	100mm (single) 180mm (double)	100mm (single) 180mm (double)	100mm (single) 150-200mm (double)

Notes:

1. See Taps 1.

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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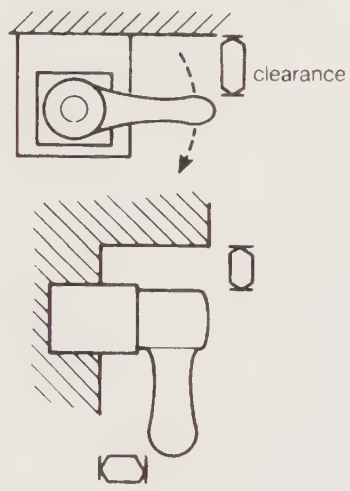
Activities:
Turning taps on and off.

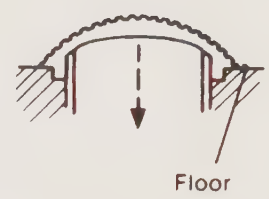
NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Taps 3

Basin

Users:
People with impaired hand function





	REMOTE CONTROL		
	LEVERS	PUSH-BUTTONS	FOOT OPERATED BUTTONS
POSSIBLE GROUPS OF USERS	Persons who have weak hands and wrists and who have restricted reach or co-ordination.	For persons who do not have much strength or co-ordination.	For persons who do not have use of arms.
RECOMMENDATIONS OF USE	For use by people in wheelchairs who have some use of arms but restricted reach.	For use by people in wheelchairs who have little use or co-ordination of hands, arms and restricted reach.	Not for use where population includes wheelchair users.
MECHANISMS	Taps are normally in the usual place but the operating mechanism is at the front of the basin unit or on the floor in front of the basin. Not self closing.		
OTHER NOTES	Where levers are located under the facia, the location action must minimise the need to reach under the worktop. Action parallel to front edge is therefore preferred.	For recommended dimensions and other characteristics for disabled use, see Manual controls, push buttons data sheet.	
Maximum temperature as on all taps should be controlled by a thermostat, since people with impaired hand function often have sensory impairments or cannot react and move quickly enough to prevent scalding.			
DIMENSIONS (mm)	Lever length 150mm pref. 100 min (all clearances 50mm min.)	Diameter or smallest dimension of button 40mm for palm operation and 25mm for finger or thumb operation.	Diameter of button min. 40mm pref. Displacement 15 - 25mm max.

Notes:

1. See Taps 1

1350 *(1300)*

Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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Telephones

(Notes to ergonomic data sheet)

General considerations

1. Telephones are required in public areas of health buildings, to enable people to contact relatives, call taxis etc. The people using them may be feeling ill or shocked, and may need to sit down to make the call; they may use a wheelchair, a walking stick or crutches, or be hard of hearing. It is easier for a taller able-bodied person to bend down or sit down to make a call than it is for a wheelchair user or someone sitting to reach up for the handset or to insert coins or a phonecard. Where space is limited, therefore, the telephone should be fixed at the lower height; where more than one telephone is provided, these may be fixed at a range of heights.

2. Telephones should be fitted with inductive couplers; telephones usable by people with hearing impairments should be clearly marked with the appropriate symbol.

3. Where possible, telephones should be located in quiet areas and be fitted with acoustic hoods.

4. A shelf should be provided adjacent to the telephone apparatus, for placing such items as handbags, purse, wallets, notes of telephone numbers, etc whilst telephoning.

5. A tip-up seat should be provided for those feeling ill or shocked, so that they may sit down while making the call; grabrails should be provided, to enable those with weakness to steady their balance and provide support whilst standing, sitting down and getting up.

6. If more than one type of telephone is provided – for example, coin operated, phonecard or taxi call – at least one of each should be accessible both to wheelchair users and to those who have hearing impairments.

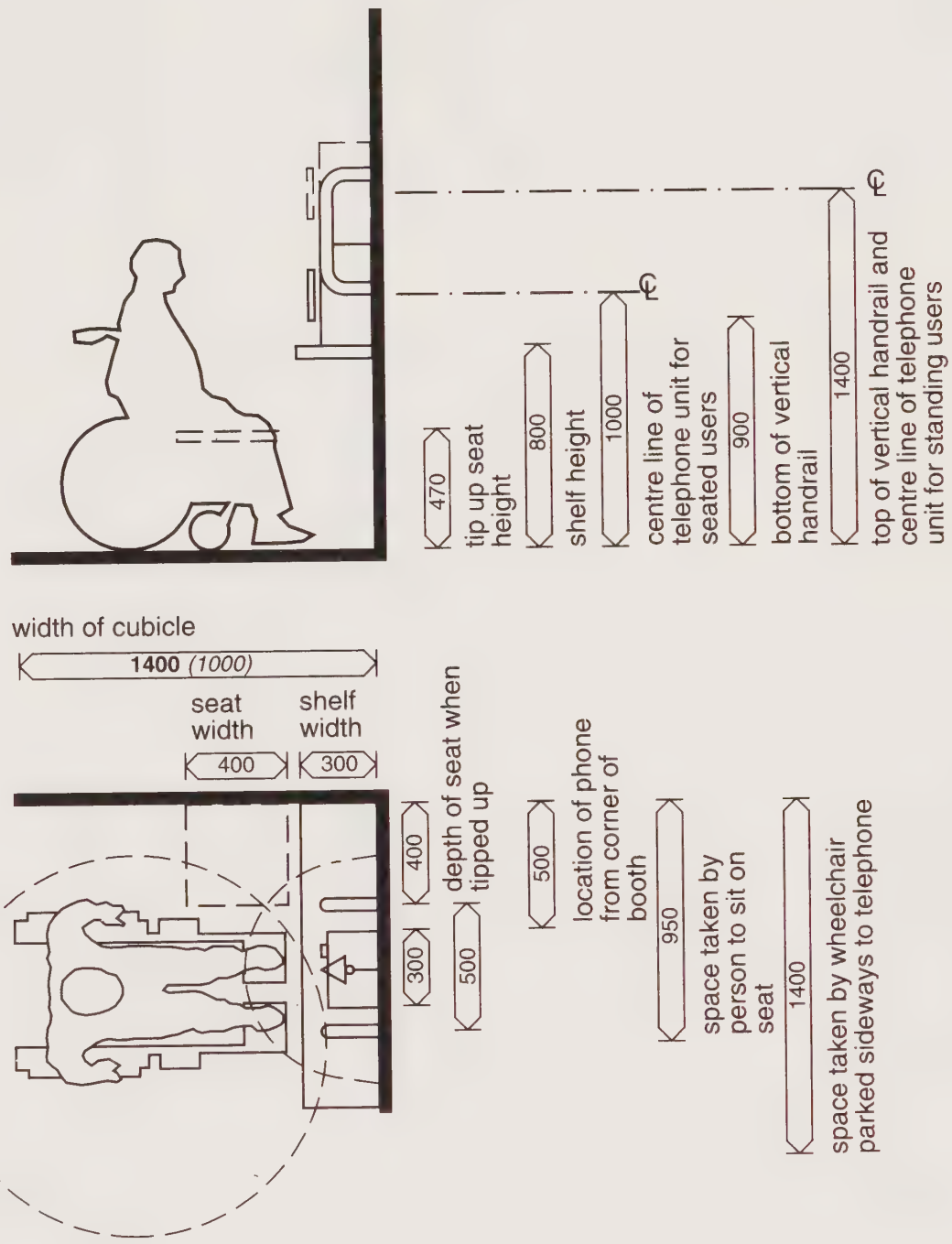
Activities:
Use of telephone.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Telephone

Standard telephone with induction loop

Users:
Full, semi, non ambulant and the hearing impaired



Notes:

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a. See notes on opposite page.

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Activities:
Use of mirror for grooming (also shaving).

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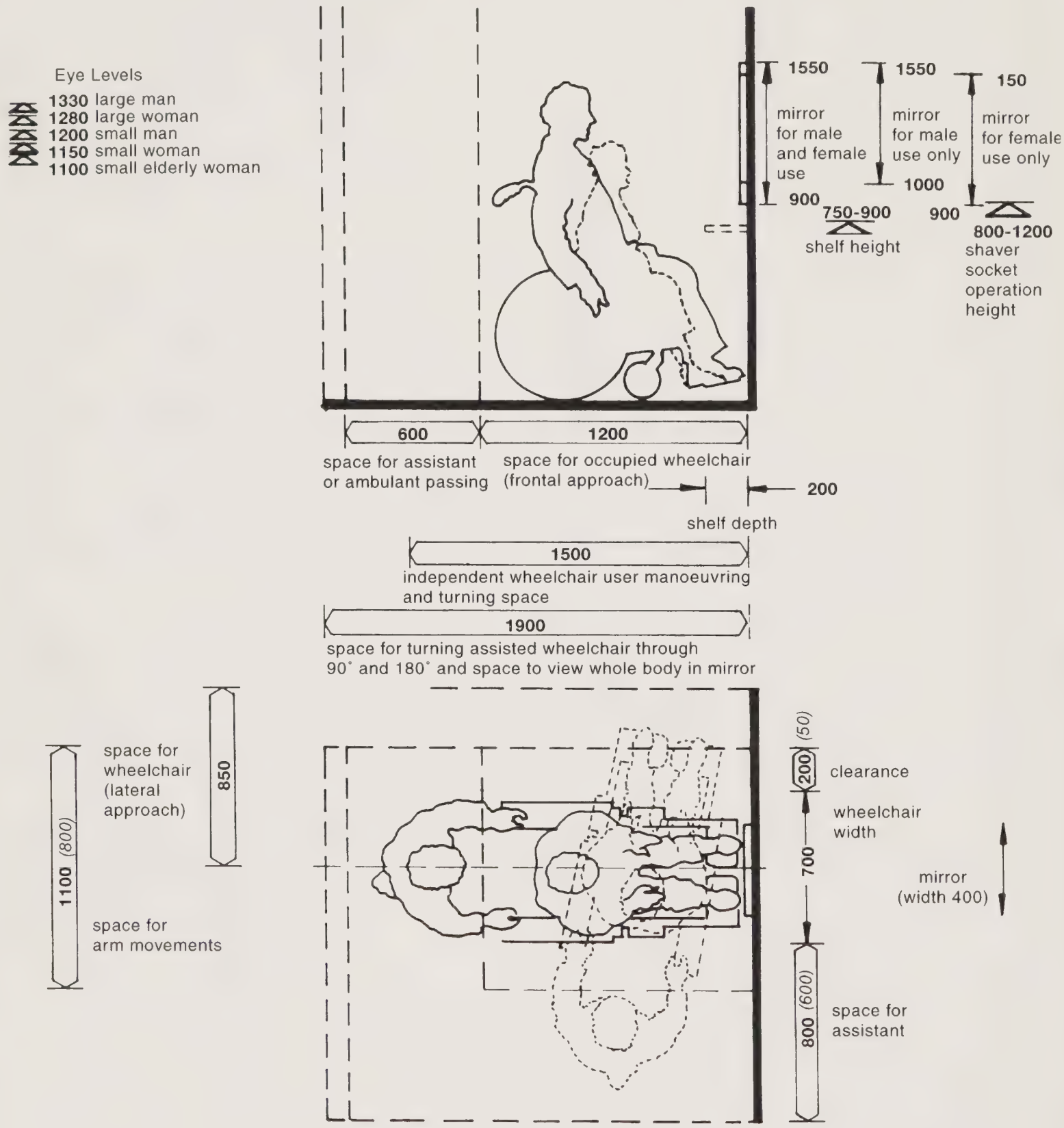
Component-user data sheet, not to scale

Mirror 1

Wall mounted

Users:
Independent and assisted wheelchair users



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Recommendations assume average viewing distance of 650mm and provide minimum reflecting surface of 150 above eye level and at least 200mm below eye level. This provides a view of the head and shoulders, sufficient to adjust a tie or necklace. The top of the mirror should be high enough above eye level to adjust a normal hat or head scarf.

2. A maximum height of 300mm above floor level will accommodate viewing of the feet from a seated position.

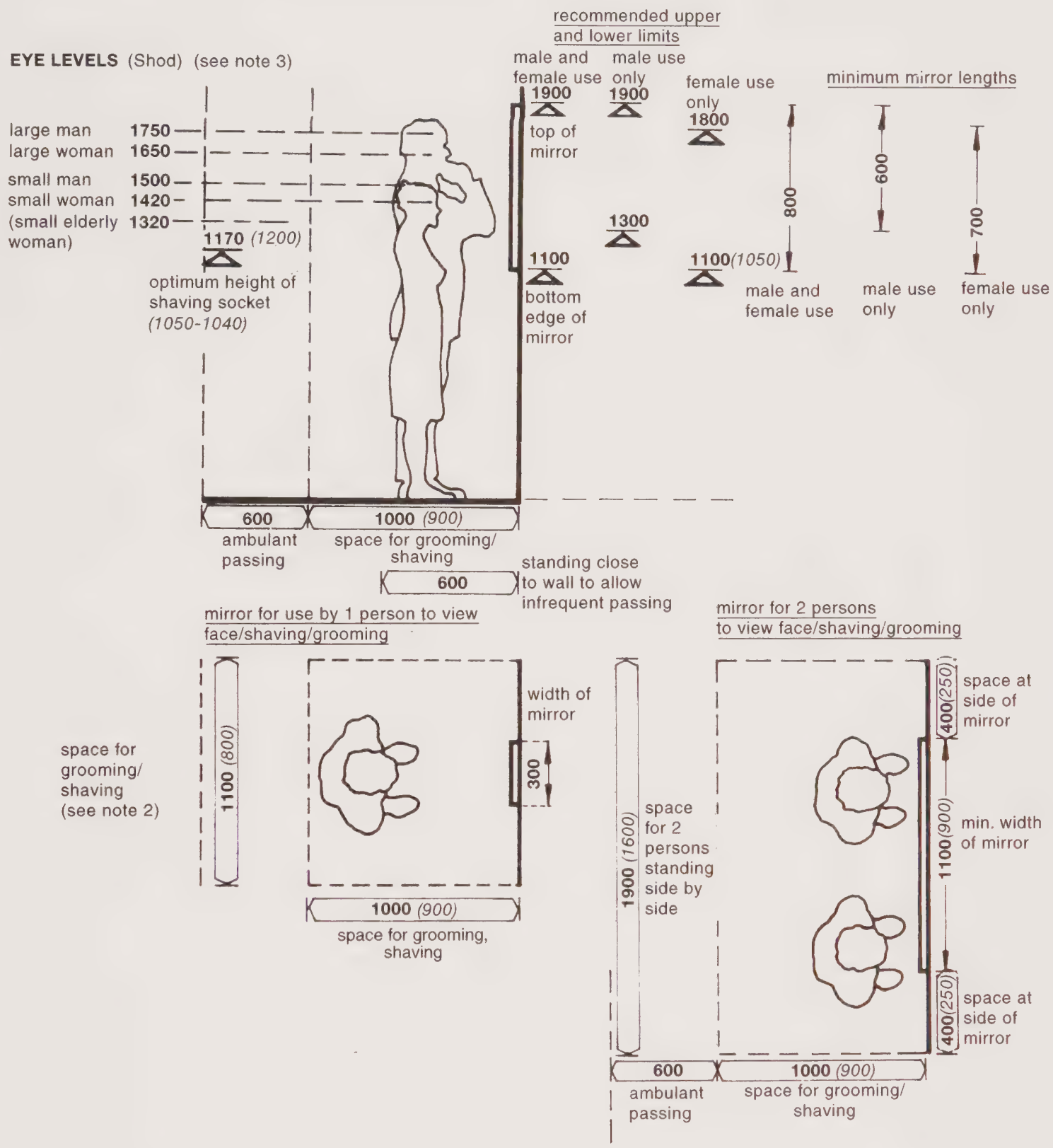
Activities:
Grooming and shaving, viewing head and shoulders only.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Mirror 2

Wall mounted, standing use

Users:
Fully ambulant and semi-ambulant adults



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. Recommendations assume average viewing distance of 650mm and provide minimum reflecting surface of 150 above eye level and at least 200mm below eye level. This provides a view of the head and shoulders, sufficient to adjust a tie or necklace. The top of the mirror should be high enough above eye level to adjust a normal hat or headscarf.

2. A lateral clearance of 800 is sufficient below waist level, but 1100 is essential above waist level for unrestricted activities such as adjusting hat, shaving, grooming. Restricted arm movements are however possible within an overall width of 800mm.

3. Heel allowances are as follows;
Large man 25
Large woman = 40
small man or woman = 10.
These reflect the critical range from outdoor footwear to light slippers for indoor use which reflect viewing needs.

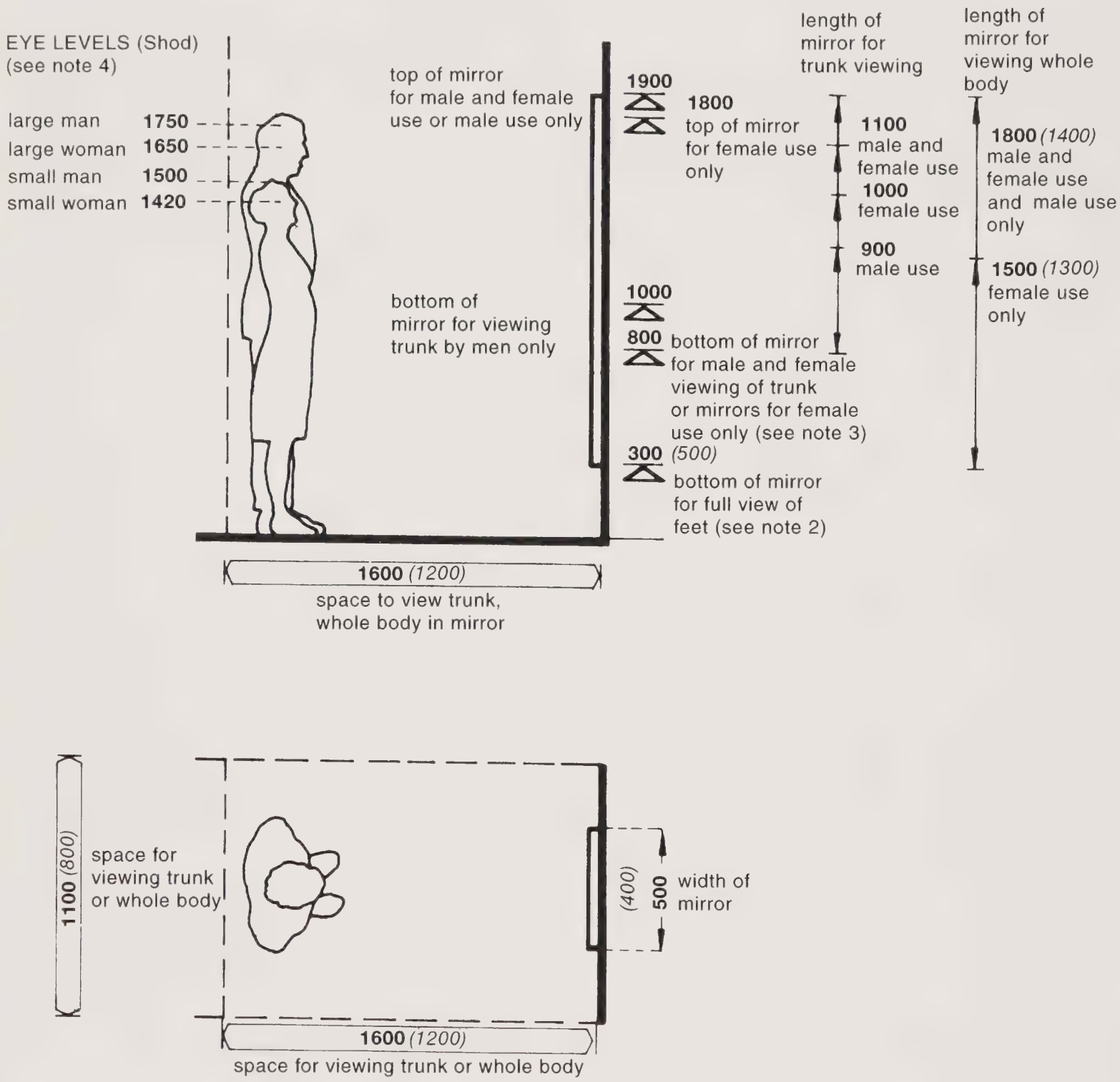
Activities:
Grooming and dressing, viewing whole trunk or whole body.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Mirror 3

Wall mounted, standing use

Users:
Fully ambulant and semi-ambulant adults



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

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1. A minimum reflecting surface of 150 above eye level is recommended for grooming hair and adjusting hat or headscarf.

2. A maximum height of 300mm above the floor will also accommodate viewing of the feet from a seated position. 500mm is the maximum height of the base of a full length mirror to allow a standing person full view of their feet.

3. Minimum height also accommodates mirror use by a small elderly woman.

4. Heel allowances are as follows;
Large man 25
Large woman = 40
small man or woman = 10.
These reflect the critical range from outdoor footwear to light slippers for indoor use which reflect viewing needs.

Windows

General considerations

1. Reference should be made to HTM 55 'Windows'.

2. Windows have two basic functions: they provide a view of the external environment, and they may allow a room's occupants to control ventilation. Daylight is important, but patients in bed require privacy and should also be protected from draughts.

3. Windows should be positioned to avoid glare and dazzle, which can cause discomfort, especially to visually-impaired people. In this connection, the fitting of adjustable blinds to control daylight and glare is recommended, though tinted glass or some other form of anti-glare treatment can also be helpful (especially for south-facing windows). Any large areas of glass should be marked by a coloured strip at least 150 mm wide, positioned at eye level (1200–1400 mm from the floor), as well as by a coloured frame, especially in circulation areas.

Approach space

4. A clear space is required in front of a window (including sufficient room for forward approach by a person in a wheelchair), in order to gain easy access for opening and closing.

Height

5. To enable those seated in a chair/wheelchair or lying in bed to look out, windows should start at a height of 600 mm above floor level; for offices etc, a height of 900 mm from the floor is acceptable. The recommended minimum height for the upper limit of windows is 2000 mm above floor level. Transoms should be at a minimum height of 1800 mm, in order not to impede sightlines.

Hardware

6. Where windows are designed to open, the handles and catches must be easy for adults to use, but at the same time not so easy that children can open them and fall out. It will therefore be necessary to fit guard rails to any windows on the first floor and above in health buildings. Additionally, any outward-opening windows on the ground floor of a building can present a hazard to visually-impaired people, as can inward-opening windows at head height. Similarly, for safety reasons, any glazing below a height of 850 mm should not be openable. Glass areas should not extend to floor level, therefore, as there is a danger of them being kicked and possibly broken.

7. As a general rule, window handles etc should be positioned for maximum accessibility. Handles and locks should be easy to grasp with one hand, and should not require a pinch grip, tight grasp or extensive twisting of the wrist to operate. It is recommended that handles are of a minimum length of 110 mm, with a circular cross section to a minimum diameter of 15 mm. The clearance between the handle and window or window frame must be a minimum of 40 mm; where possible, 60 mm is recommended.

8. Any devices for closing curtains and blinds (such as lever handles or push/pull bars) should also be located within the recommended height range for handles. (Lever handles should be between 350 mm and 500 mm from the corner of the window.) To enable high windows to be opened from below, extension handles – for example, for those above sinks in kitchens and bathrooms – should be fitted.

9. Windows with two handles which need to be operated simultaneously – for example, those of the sash type – should be avoided.

Force required to open

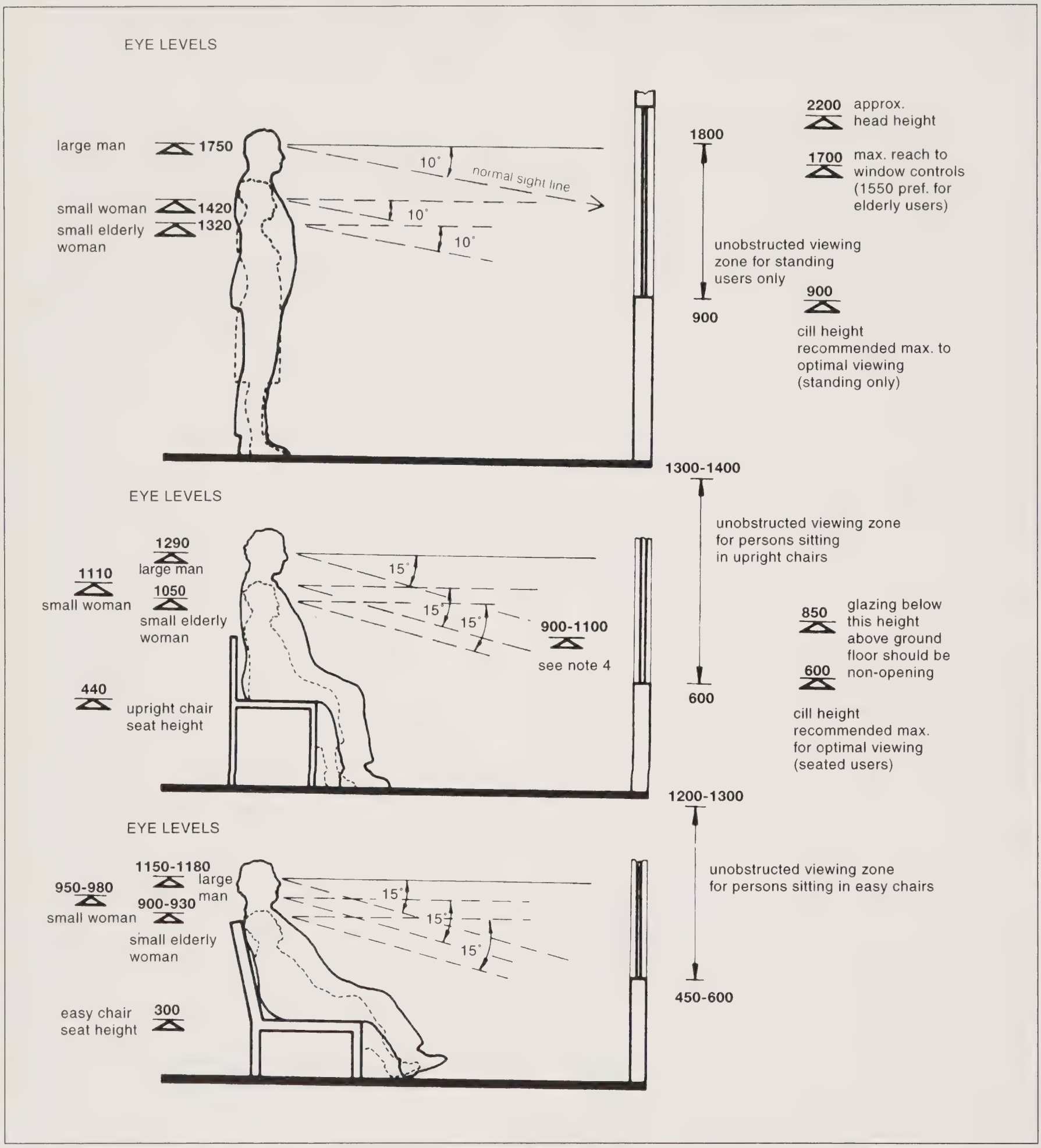
10. Side-hanging and horizontally-pivoted windows are the easiest to operate. Windows requiring pushing, pulling or lifting should require a maximum of 22.2 N force to open or close; the maximum torque to operate any window furniture should be 5.4 N.

Activities:
Looking out of windows, use of window controls.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Windows 1

Users:
Standing and seated users



Notes:

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Preferred minimum: *(Restricted minimum, not recommended for general use, see explanatory notes)*

a. See notes on separate page.

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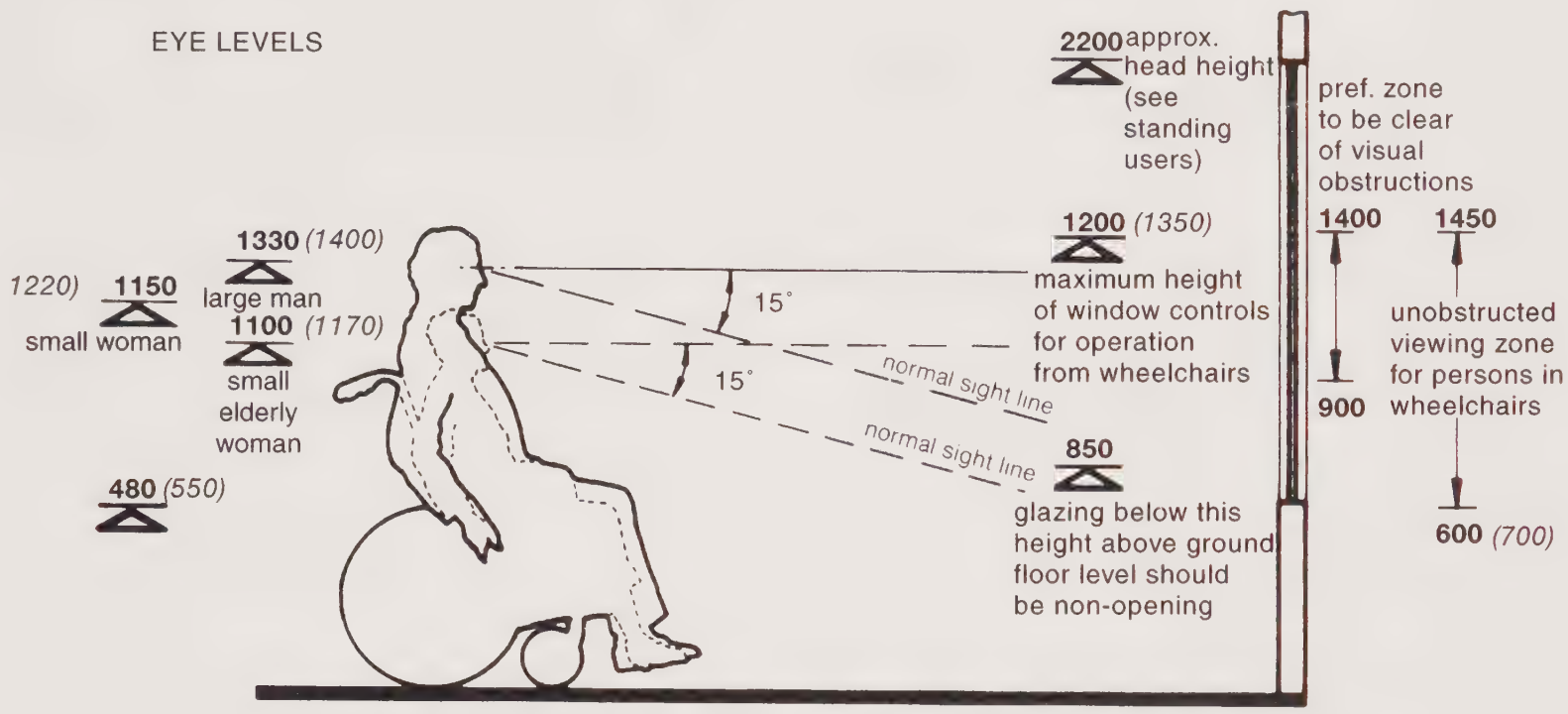
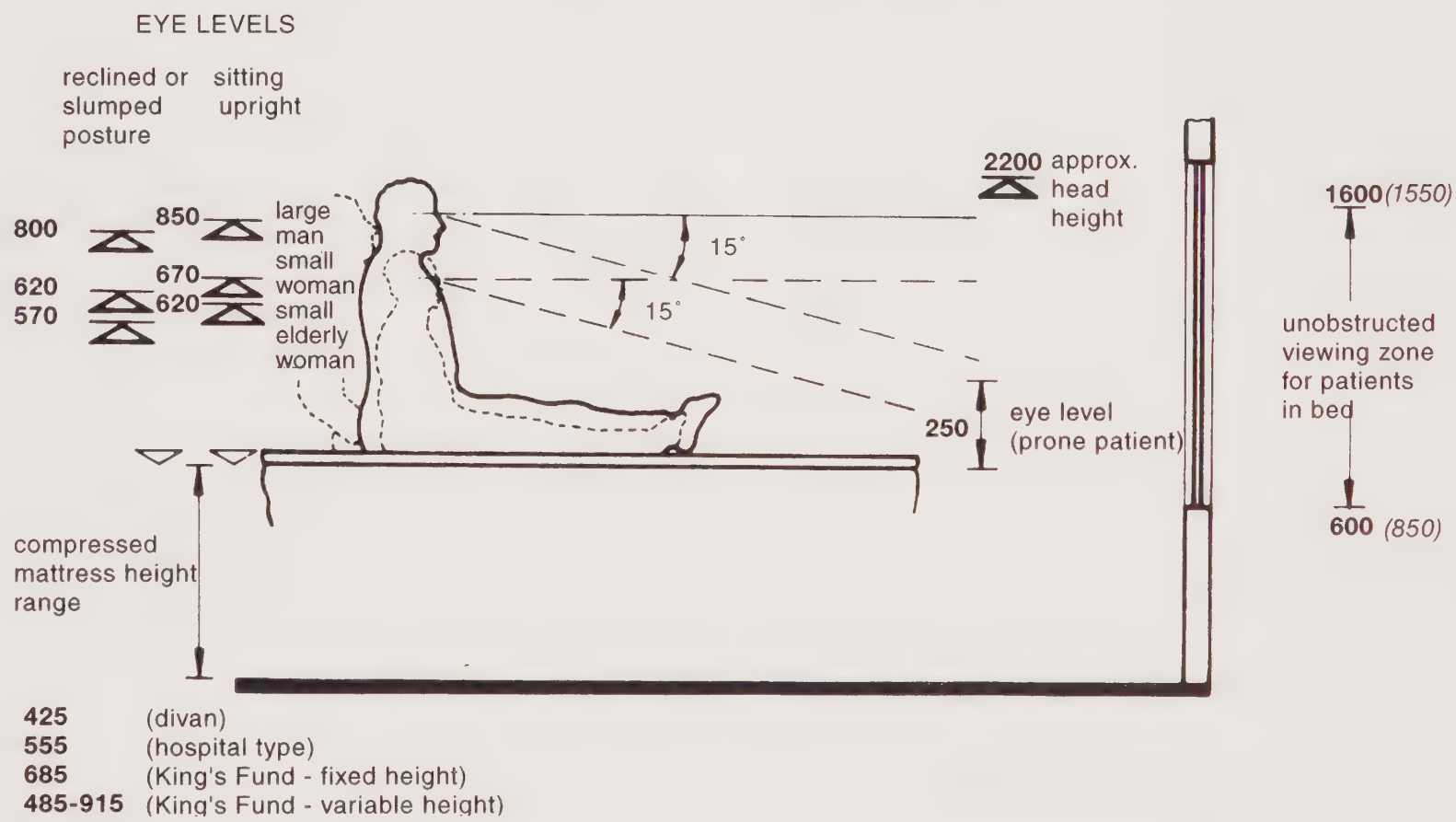
Activities:
Looking out of windows, use of window controls.

NHSEstates Ergonomic Data Bank
Component-user data sheet, not to scale

Windows 2

Users:
Wheelchair users and patients in bed





Notes:

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a. See notes on separate page.

Appendix 1

Healthcare premises: check-list of access and facilities for disabled people

Parking

1. Are there parking spaces adjacent to the building(s) to minimise the distances to be travelled?

2. Is parking space wide enough to allow car door to open fully to allow unobstructed transfer into a wheelchair, either unassisted or assisted?

3. Is the location of the disabled parking spaces such that the approach route to the building/facility is not obstructed by other parked cars and away from moving traffic?

4. Are kerbs and other changes of level ramped?

5. Is the parking space and access route under cover?

6. Are there adequate signs to identify the reserved parking spaces and the best routes into the premises?

Approach to building

7. Is the approach route smooth, slip resistant (whether wet or dry), free from incidental obstructions or hazards?

8. Are handrails provided on all slopes and resting places provided at intervals where a ramp or approach is long?

9. Are all public entrances to the building/facility accessible?

10. Are access doors wide enough to facilitate wheelchair movement?

11. Are thresholds eliminated or kept to a minimum?

12. Do door characteristics and dimensions of related spaces allow it to be opened (and closed) easily by independent wheelchair users, moving in either direction?

13. What doors can be eliminated?

Internal circulation

14. Are lobby sizes adequate and safe both for independent and assisted wheelchair use?

15. Are corridor and approach routes satisfactory? Do they allow passing and turning and take adequate account of corridor traffic conditions?

16. Have all obstructions and projections from walls (or ceiling) or similar hazards at floor level – such as changes of level – been avoided? If unavoidable are they clearly discernible?

17. Are internal door widths adequate to allow turning through 90° from the corridor or lobby? Should either or both be increased?

18. Have safety handrails been provided on corridors, ramps, steps or at other points where they are required by persons with impaired mobility? Have they been produced where they can be used as location aids by visually impaired people?

19. Are any large areas of glass close to circulation areas marked or framed so as to be clearly discernible to partially sighted people?

20. Are seats available at intervals to permit an ambulant disabled and elderly person to take a short rest when faced with long corridors to negotiate?

Vertical circulation

21. Are staircases safe and optimally comfortable for elderly and disabled people? Are handrail and landing characteristics satisfactory?

22. Are lifts available, conveniently placed, accessible and clearly signed?

23. Are lift controls accessible to the independent wheelchair user? Are the visual and audible signals, alarms and floor designations satisfactory? Are digits embossed and satisfactory for blind or partially sighted persons? Is there a tip-up seat, or a support rail available?

Toilets

24. Are there correctly designed unisex toilets, that is, where a husband and wife may enter the cubicle together, available in the public areas of the premises?

25. Are there suitable cubicles for wheelchair users in other male and female toilets in the building?

26. Do cubicles for wheelchair users provide adequate manoeuvring space within, or is turning space provided outside? Is the level of privacy afforded satisfactory?

27. Are there cubicles available with appropriate grabrails for the use of ambulant disabled people?

28. Are the WC and wash-basin arrangements accessible to independent wheelchair users? Are the grabrails, mirrors, towels, door closing bars and other aids placed satisfactorily?

Out-patient and treatment areas

29. Can ambulances discharge patients under cover within close proximity of the entrance? Are waiting areas protected from draughts as patients move in and out through the entrance doors? Can patients using wheelchairs (their own or hospital chairs whilst waiting for treatment), sit with other patients without obstructing the corridors or circulation area?

30. Can patients in wheelchairs use the reception desk conveniently and privately?

31. Are all consulting and treatment areas fully accessible?

32. Are there changing cubicles suitable for wheelchair users, with room for assistance to be given if required?

33. Are refreshment areas accessible to disabled people?

34. Are clear, well lit, signs posted to ensure easy circulation within the building?

35. Are telephones and other public mechanisms accessible to wheelchair users? Are knobs, dials, switches, handles and other controls operable and within convenient reach?

Ward facilities

36. Do sanitary facilities offer maximum independence and privacy to disabled patients, both those who will be using wheelchairs and those who have walking difficulties?

37. Is the day room accessible, with a variety of seating heights to help ambulant disabled people? Are all notices clear to see and understand?

38. Are window controls, radio and television and call bells easily reached by disabled patients?

39. Can disabled visitors conduct private conversations with their friends in bed or in the ward?

Other features

40. Could disabled employees work in the building – with particular reference to offices, laboratories, canteen, rest-rooms and toilet facilities?

41. Are emergency evacuation routes and emergency exits satisfactory?

42. Are fire alarms readily accessible to the semi-ambulant and wheelchair disabled? Are emergency call facilities installed to summon assistance to remote locations?

43. Are audio/visual alarm signals provided?

Appendix 2

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Appendix 4

Activity Data

1. "Activity data" is an information system developed to help project and design teams by defining the users' needs more precisely. This information constitutes the computerised Activity DataBase, which is updated twice yearly. It comprises three types of information sheet: activity space data sheets (known as A-Sheets), their supporting activity unit data sheets (known as B-Sheets) and A-Sheet component listings (known as D-Sheets).

2. A-Sheets record in more detail than is described in this Note each task or activity that is performed in a particular activity space (which may be a room, space, corridor or bay), together with environmental conditions and the technical data necessary to enable the activities to be performed. Each A-Sheet also contains a list of the titles and code numbers of the relevant B-Sheets.

3. B-Sheets provide narrative text and graphics to scale relating to one activity. They show equipment fitted or supplies as part of the building, and also the necessary engineering terminals.

4. D-Sheets provide information about the total quantities of components (excluding those in Group 4 – see paragraph 1.12) extracted from all B-Sheets selected for inclusion in an individual A-Sheet.

5. Activity data is only available in the form of magnetic media, but this may be used to generate paper copies where required.

6. Further information about the use and preparation of activity data can be obtained from NHS Estates, Department of Health, 1 Trevelyan Square, Boar Lane, Leeds LS1 6AE.

Activity data applicable to this Note

7. The A-Sheets recommended for the activity spaces described in this Note are either new sheets, amended ones or selected from existing sheets. A list of A-Sheet code numbers and titles is given at the end of this chapter.

8. Further activity data sheets may be selected, or drawn up by project teams to their own requirements, for any services not described in the Note or included in the list.

9. In order to ensure consistent and economic provision, variations from the A-Sheets recommended for the spaces covered in this Note should be considered only where it has been decided that the function of a space will differ substantially from that described.

Lists of activity data A-Sheets

10. The activity data A-Sheets listed below may not carry a title identical to the activity spaces detailed in this Note. Use of the appropriate A-Sheet code number will, however, result in the correct activity space being accessed.

11. The activity data A-Sheets are listed below in the same order as the spaces to which they relate are listed in the Schedule of Accommodation.

Note The foregoing applies to the MS.DOS application only. During the currency of this Note an MS.Windows application is being introduced with the following consequences:

A-Sheets are replaced by room data sheets;

B-Sheets are replaced by assemblies;

the term 'D-Sheets' is omitted from component listings.

Activity space	A-sheet code
WC/Rinse basin: fully ambulant users	V1007
WC/Rinse basin: ambulant, semi and assisted ambulant, frontal access	V1101
WC/Rinse basin: ambulant, semi and assisted ambulant, lateral access	V1102
WC/Rinse basin: independent wheelchair users, 'Specimen' WC	V0906
WC/Rinse basin: independent and assisted wheelchair users	V0904
WC/Rinse basin: assisted wheelchair users, dual access	V1214
WC/Bidet/Wash basin: independent semi, and assisted ambulant users	V1209
Bathroom/WC/Wash	V1709
Bathroom/WC/Wash: treatment, assisted patient, use of hoist	V1714
Shower: ambulant staff users	V0801
Shower/WC/Wash: assisted patient wheelchair users	V1608
Shower/WC/Wash: assisted patient wheelchair users	V1612
Shower/WC/Bidet/Wash	V1620

Appendix 5

Index of Data Ergonomic Sheets in other volumes of HBN 40

Volume 2 – Treatment areas

Consulting/examination/treatment
Consulting/examination room – General Type 1
Consulting/examination room – General Type 2
Consulting/interview room
Examination room 1
Treatment room 1

Bed/cot care
Bed, various
Bed, divan
Single bedroom 1
Single bedroom 2
Single bedroom 3
Single bedroom 4
Twin bedroom 1
Bed space
4 bed space
6 bed space

Patient hoists
Patient Hoist 1, mobile chair (wide or narrow base) turning 90°
Patient Hoist 2, mobile chair turning 90° + 180°
Patient Hoist 3, mobile chair (wide or narrow base) to and from bathroom
Patient Hoist 4, with chair attachment, drying and dressing patient
Patient Hoist 5, mobile chair hoist, manoeuvring into and out of bath

Toilets
Toilet 2, ambulant, semi- and assisted ambulant – frontal access
Toilet 3, ambulant, semi- and assisted ambulant – lateral access
Toilet 4, independent wheelchair users, with basin
Toilet 5, independent and assisted wheelchair users, with basin
Toilet 6, dual assisted wheelchair users, with basin
Toilet 7, WC with bidet and basin

Bathrooms
Bathroom 1, ambulant, assisted ambulant and independent wheelchair patients; WC and personal washing facility
Bathroom 2, assisted patients; use of hoist, WC and personal washing facility

Showers
Shower 1, partially capable users with assistance and wheelchair users; with WC and wash basin – linear layout
Shower 2, partially capable users with assistance and wheelchair users; with WC and wash basin – non-linear layout
Shower 3, shower/WC/bidet

Components
Desk 1, Doctor's, with drawers on one side
Chair 3, upright; sitting, assisted and independent changing
Person 8, dressing/undressing
Low partition, bed-space privacy screen
Switches and sockets, wall-mounted
Door Screen 1, single door, 1000 + 900 doorsets
Door Screen 2, 1500 doorsets
Bidet, ambulant or semi-ambulant patients
Bath 1, wheelchair access
Basin 1, handrinse
Basin 2, medium; personal washing
Basin 3, handrinse (wheelchair users)
Basin 4, medium (wheelchair users)
Basin 5, medium; clinical washing (Staff users)
Taps 1, basin
Taps 2, basin
Taps 3, basin
Wardrobe 1, clothes storage (wheelchair users)
Shelving 3, open 200 deep (wheelchair users)
Worktop Bench 3 (independent or assisted wheelchair users)
Cupboard 3, wall-mounted (wheelchair users)
Drawers 1, Independent and wheelchair users
Sink 1 (wheelchair users)
Sink 2, Laundry (wheelchair users), lateral approach
Sink 3, Laundry (wheelchair users), frontal approach
Sink 4, stainless steel, single with draining-board (general use)
Ironing board 1 (partially capable, standing or seated users)
Ironing board 2 (assisted and independent wheelchair users)
Oven 1, small
Cooking hob 1, small
Refrigerator 1
Washing-machine 1, front-loading
Planting bed 1 (partially capable users)
Planting bed 2 (wheelchair users)
Planting bed 3 (wheelchair users)

Volume 3 – Staff areas

Reception area – general
Staff base – ward
Pantry
Interview room / relatives' accommodation
Seminar room

Utility spaces and disposal
Clean utility – in-patient
Dirty utility – general
Disposal room

Cleaning spaces
Cleaning space – general
Cleaning space – team/heavy duty

Offices
Office 1 – general
Office 2 – senior staff
Office 3 – all disciplines
Office 4 – medical, Doctor's office
Office 5 – medical, head of division
Office 6 – medical, 2 senior staff
Office 7 – interview/overnight stay

Toilets
Toilet 1, fully ambulant, with basin
Toilet 2, ambulant, semi- and assisted ambulant – frontal access
Toilet 3, ambulant, semi- and assisted ambulant – lateral access
Toilet 4, independent wheelchair users, with basin
Toilet 5, independent and assisted wheelchair users, with basin

Showers
Shower 4, ambulant staff users

Components
X-ray illuminator
Desk 2, single pedestal (1200 x 700)
Chair 1, upright
Chair 4, semi-easy, low-back
Filing cabinet 1-, 2-, 3- or 4-drawer
Filing cabinet 2, 3 or 5 rails laterally suspended
Shelving 1, racking, 200-300 deep
Shelving 2, racking, 450-600 deep
Shelving 3, open, 200 deep (wheelchair users)
Worktop Bench 1
Worktop Bench 2
Worktop Bench 3, Independent and assisted wheelchair users
Cupboard 1, Small, wall-mounted
Cupboard 2, Small, wall-mounted
Cupboard 3, Wall-mounted, Wheelchair users
Cupboard 4, Low-level
Drawers 1, Independent wheelchair users
Screen/Board 1
Screen/Board 2
Person 8, Dressing/undressing
Seat and clothes hooks; changing
Locker 1, small luggage
Locker 2, Staff
Switches & Sockets, wall-mounted
Suction Cleaner, Cylinder-type
Scrubber/Polisher
Bucket Trolley, Double, with wringer
Basin 5, Medium; clinical washing (staff users)
Sack Holder, Large, mobile
Sink 4, Stainless steel, single with draining-board

Volume 4 – Circulation areas

Ambulant people
Person 1, walking – circulating and passing
Person 2, walking, with assistance
Person 3, with walking sticks or tripods, and assistance
Person 4, with crutch or crutches, and assistance
Person 5, with walking frame

Wheelchairs
Wheelchair 1, straight movement
Wheelchair 2, around corner
Wheelchair 3, turning
Wheelchair 6, parking end to end
Wheelchair 7, parking side by side
Corridor – ambulant and wheelchair users: circulating and parking

Patient trolleys
Patient trolley 1, straight movement
Patient trolley 2, around corner
Patient trolley 3, through 1500 doorset
Patient trolley 4, through 1900 doorset

Beds
Bed 1, adjustable or fixed-height bed sizes
Bed 2, straight movement, with or without attendants
Bed 3, through 1500 doorset
Bed 4, through 1900 doorset
Bed 5, turning 90° corner
Bed 6, turning through 180° corner

Lobbies
Lobbies 1, Single-leaf doors
Lobbies 2, Double-leaf doors
Lobbies 3, Automatic sliding doors

Lifts and stairs
Lift and Controls – passenger, 1600 x 1400
Lift – multi-purpose stretcher/trolley, 1400 x 2400
Lift – bed, 1800 x 2700
Internal stairs
Staircase, mattress evacuation 1: straight flight – corridors
Staircase, mattress evacuation 2: landings and stairs

Trolleys/mobile equipment (large)
Trolley/mobile equipment 1 – types
Trolley/mobile equipment 2 – types
Trolley/mobile equipment 3, straight movement
Trolley/mobile equipment 4, around corner
Trolley/mobile equipment 5, through doors (1000 or 1200)
Trolley/mobile equipment 6, though doors (1400 or 1800)
Trolley/mobile equipment 7, turning
Trolley/mobile equipment 8, parking at 90° to wall
Trolley/mobile equipment 9, parking parallel to wall
Platform truck 1, straight movement
Platform truck 2, around corner and through doorway

Platform truck 3, turning
Pallet truck 1, straight movement
Pallet truck 2, around corner and through doorway
Pallet truck 3, turning
Pallet truck 4, parking
Sack truck 1, tilting, and straight movement
Sack truck 2, around corner
Sack truck 3, through doorway
Sack truck 4, turning

Tugs and trains
Tug 1, basic dimensions; straight movement
Tug 2, turning
Tug 3, charging bay
Tug and train 1, straight movement
Tug and train 2, around corner, chamfer A
Tug and train 3, around corner, chamfer B
Tug and train 4, turning into an opening
Tug and train 5, turning
Tug and train 6, ramps
Tug and train 7, lay-by

Service ducts
Service duct 1, Horizontal crawlway – access hatch
Service duct 2, Horizontal crawlway – through route
Service duct 3, Vertical shaft with ladder
Service duct 4, Step ladder
Service duct 5, Horizontal (floor/ceiling) hatch
Service duct 6, Catwalk
Service duct 7, Horizontal walkway with or without services
Service duct 8, Horizontal crawlway with services

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